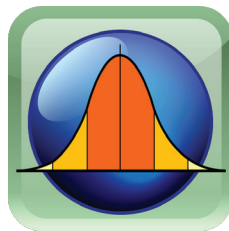


Record measured values comparably and uniformly

The measurement uncertainty provides information about the precision of a measurement method and about which deviation can be tolerated at a determined value. **pdv-mus3** determines the measurement uncertainty of your processes and thus supports you in continuously ensuring the quality of the results of your laboratory.

With pdv-mus3 you can

- record measured values uniformly and thus comparably,
- manage reference materials, reference analyses, proficiency tests, etc.
- generate meaningful evaluations and reports,
- store and archive data long term.



compared to an actual value. Such deviations can be determined by repeated measurements over time or by comparative studies with reference materials.

dition, an address management system for contact data of the manufacturers of reference materials is integrated into pdv-mus3.

You can easily create, edit, and delete samples for reference materials or proficiency tests and categorise by manufacturer or material.

The basis is the analytical calculation model using the established approach according to Nordtest, supplemented by numerous data related to the measurement.

pdv-mus3 monitors whether analytical methods are suitable to obtain comparable results. Random deviations according to the distribution of the measured results can be considered as well as systematic deviations, for example a shift in the distribution

pdv-mus3 is prepared for spark spectrometry (S-OES) as an example, but can also be used for other analysis methods by individual configuration.

Individual configurations

Firstly, you configure the necessary units, parameters, analysis methods, materials, manufacturers, reference materials and proficiency tests in the master data. Centralizing this data not only avoids a lot of “paperwork” later, but also creates the prerequisite for a uniform database that can be evaluated in many ways. In ad-

Datum	Mittelwert	EW 1	EW 2	EW 3	EW 4
Parameter: Si					
22.06.2021	7,1373	7,1373	7,0466	7,1617	7,2037
Parameter: Fe					
22.06.2021	0,0916	0,0916	0,0901	0,0919	0,0926
Parameter: Cu					
22.06.2021	0,5077	0,5077	0,5037	0,5089	0,5105
Parameter: Mn					
22.06.2021	0,0745	0,0745	0,0738	0,0743	0,0755
Parameter: Mg					
22.06.2021	0,4053	0,4053	0,4031	0,4112	0,4014
Parameter: Zn					
22.06.2021	0,0133	0,0133	0,0132	0,0131	0,0135
Parameter: Ti					
22.06.2021	0,1087	0,1087	0,1086	0,1073	0,1101

Details to measurements of all parameters of a material



Advantages over MS Excel

The use of MS Excel with a growing number of files and worksheets can provide results in individual cases, but neither ensures a uniform, controlled recording of the values, nor creates a continuously comparable database. With pdv-mus3, all measurements are recorded according to standardized specifications. The calculated results allow for comparable evaluations, even over long periods of time.

Clear comparisons and evaluations

To evaluate the range and the mean value of measurements, two to four individual values are required per sample. The evaluation of the results is possible for materials or individual parameters (for example chemical elements) in different concentrations.

When selecting a material, you will get an overview of the measurement uncertainty for all defined and analytically determined parameters of that material. The results allow for a statement, of how well materials get characterised in your laboratory.

The selection of a parameter will show an overview of the measurement uncertainty for said parameter in different (previously selected) materials.

For each parameter, you can specify the preferred material, proficiency test and/or production samples to be used for the calculation. The calculated uncertainties display how this parameter behaves, e.g. for different validity ranges or alloy groups.

Advanced reporting

For the transfer and documentation of the results, pdv-mus3 can be extended by a comprehensive reporting system based on MS Office, with which reports can be individually designed, automatically distributed and be archived long-term.

Abschätzung der Messunsicherheit

Element	Si	Si
Konzentrationsbereich		
Berechnungsart	absolute Messunsicherheit	relative Messunsicherheit
Unsicherheit aus Referenzmaterial	0,09064	0,88%
Unsicherheit aus Ringversuchsprobe	0,09064	0,88%
Unsicherheit aus Produktionsproben	0,10002	0,94%
kombinierte Messunsicherheit	0,13498	1,29%
enw. Messunsicherheit	0,26997	2,58%
Referenzprobe (ZRM)		
	412/08 (Alcan)	412/08 (Alcan)
zertifizierter Wert	10,26	10,26
Intervall (+/-)	0,17	0,17
Konfidenzniveau	0,95	0,95
Labormittelwert	10%	10%
Standardabweichung	0,0528	0,0528
Ringversuchsprobe		
	412/08 (Alcan)	412/08 (Alcan)
zertifizierter Wert	10,26	10,26
Intervall (+/-)	0,17	0,17
Konfidenzniveau	0,95	0,95
Labormittelwert	10%	10%
Standardabweichung	0,0528	0,0528
Produktionsprobe		
Standardabweichung (k=2)	0,0887	0,0887
Gesamtmittelwert	10,652335	10,652335
Spannweite	0,100023	0,100023
rel. Spannweite = rel. Unsicherheit	0,94%	0,94%

Exemplary report on measurement uncertainty

Probe Nr.	Werkstoff	Parameter	Probe Entnahme	Analyse	Mittelwert	Standardabweichung	Spannweite	rel. Spannweite
Demo Probe Produktion 1	EN AC-45500	Si	22.06.2021	Funken OES	7,1373	0,0664	0,1571	2,20 %
Demo Probe Produktion 1	EN AC-45500	Fe	22.06.2021	Funken OES	0,0916	0,0011	0,0025	2,73 %
Demo Probe Produktion 1	EN AC-45500	Cu	22.06.2021	Funken OES	0,5077	0,0029	0,0068	1,34 %
Demo Probe Produktion 1	EN AC-45500	Mn	22.06.2021	Funken OES	0,0745	0,0007	0,0017	2,28 %
Demo Probe Produktion 1	EN AC-45500	Mg	22.06.2021	Funken OES	0,4053	0,0043	0,0098	2,42 %
Demo Probe Produktion 1	EN AC-45500	Zn	22.06.2021	Funken OES	0,0133	0,0002	0,0004	3,01 %
Demo Probe Produktion 1	EN AC-45500	Ti	22.06.2021	Funken OES	0,1087	0,0011	0,0028	2,58 %

A clear view on all measurements incl. mean value and standard deviation

Background: measurement uncertainty

Each measured result can only be as accurate as the measurement method. Different measurement methods or techniques, the measurement environment and the preparation of measured samples result in values deviating from the true value of the measured parameter. How accurate a measured value is, and/or the limits within which the actual value is assumed, can be determined mathematically as measurement uncertainty. A basic requirement for accurate determination of uncertainties are standardised and unified methods for measuring and determining values.

A defined measurement uncertainty objectifies and continuously ensures the quality of the measured results within thresholds – a prerequisite for accredited laboratories. Especially in the case of quality data, the customer/client receives the necessary reliability that his requirements are met.

pdv-mus3 Professional

In the standard version, pdv-mus3 includes a single-user licence (via dongle) as well as an SQLite database for installation on a single workstation.

pdv-mus3 Professional enables simultaneous access by multiple users to a common database. In addition, data from other measurement data sources (e.g. laboratory software solutions, devices) can be imported. An integration into the laboratory information management system pdv-lims3 is already prepared, an exchange of interlaboratory test results via web portal is currently under development.

For more information visit www.pdv-software.de/loesungen/

Would you like to know more about us or our solutions? We look forward to your inquiry.

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