IFA
Institut für Arbeitsschutz der
Deutschen Gesetzlichen Unfallversicherung

Nano Exposure & Contextual Information Database (NECID)

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perosh
CIOP PIB Centralny Instytut Ochrony Pracy Państwowy Instytut Badawczy
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HEALTH & SAFETY LABORATORY
inrs Institut National de Recherche et de Sécurité
FORSKNINGSCENTER FOR ARBEJDSMILJØ
TNO innovation for life

Beginnings:
Spin-Off of the NANOSH project

- Within the EU funded NANOSH project (11/2006 – 11/2009):
  - FIOH, IFA, TNO, CIOP, HSL, …
  - An agreed measurement strategy and an approach to report *(e.g. contextual information)* and analyze data *(e.g. background distinction)* was developed.
  - Workplace aerosol data have been collected for *~150 exposure situations.*
  - The NANOSH dataset constitutes a nucleus of a database for exposure to MNM.

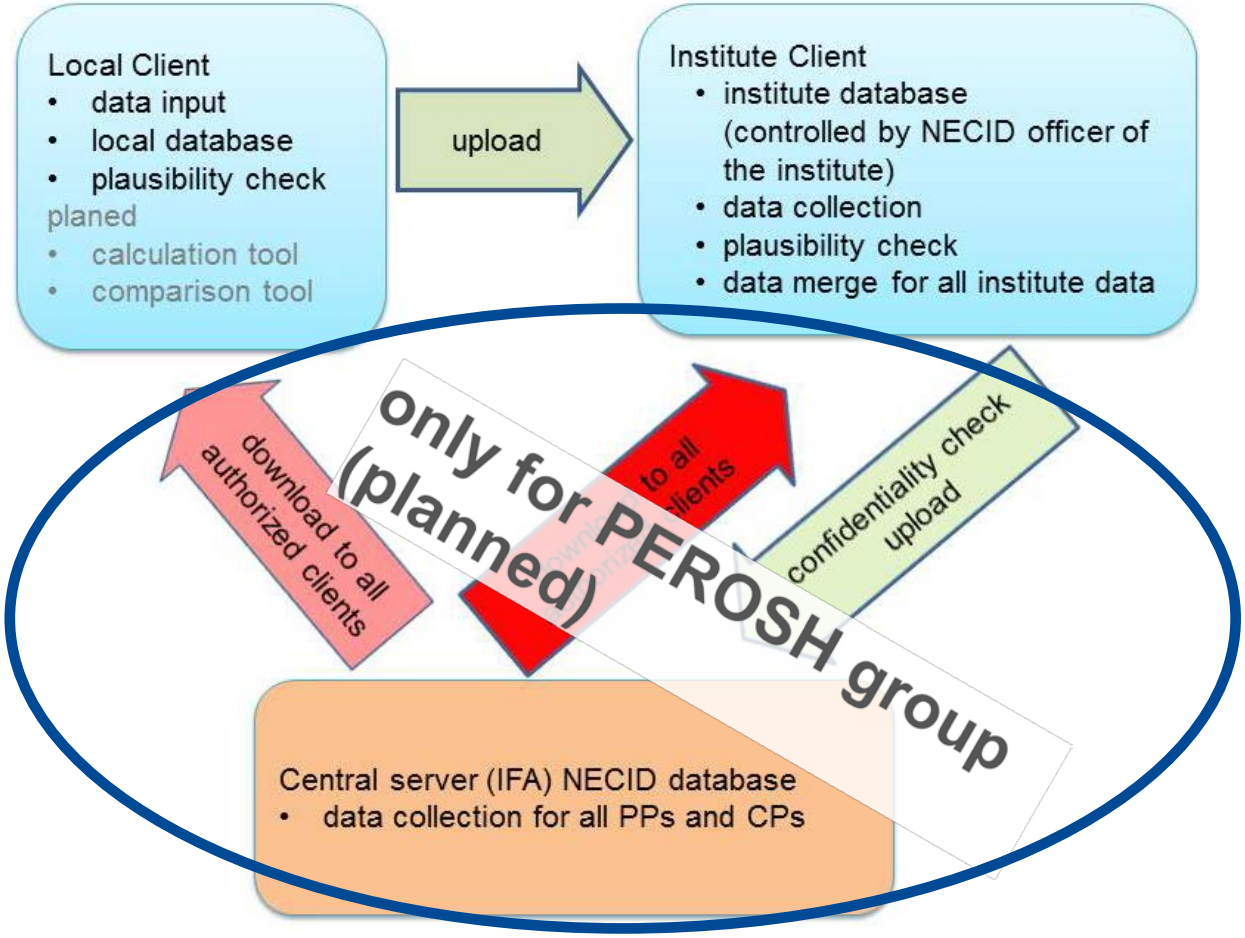
NECID – Motivation and aims

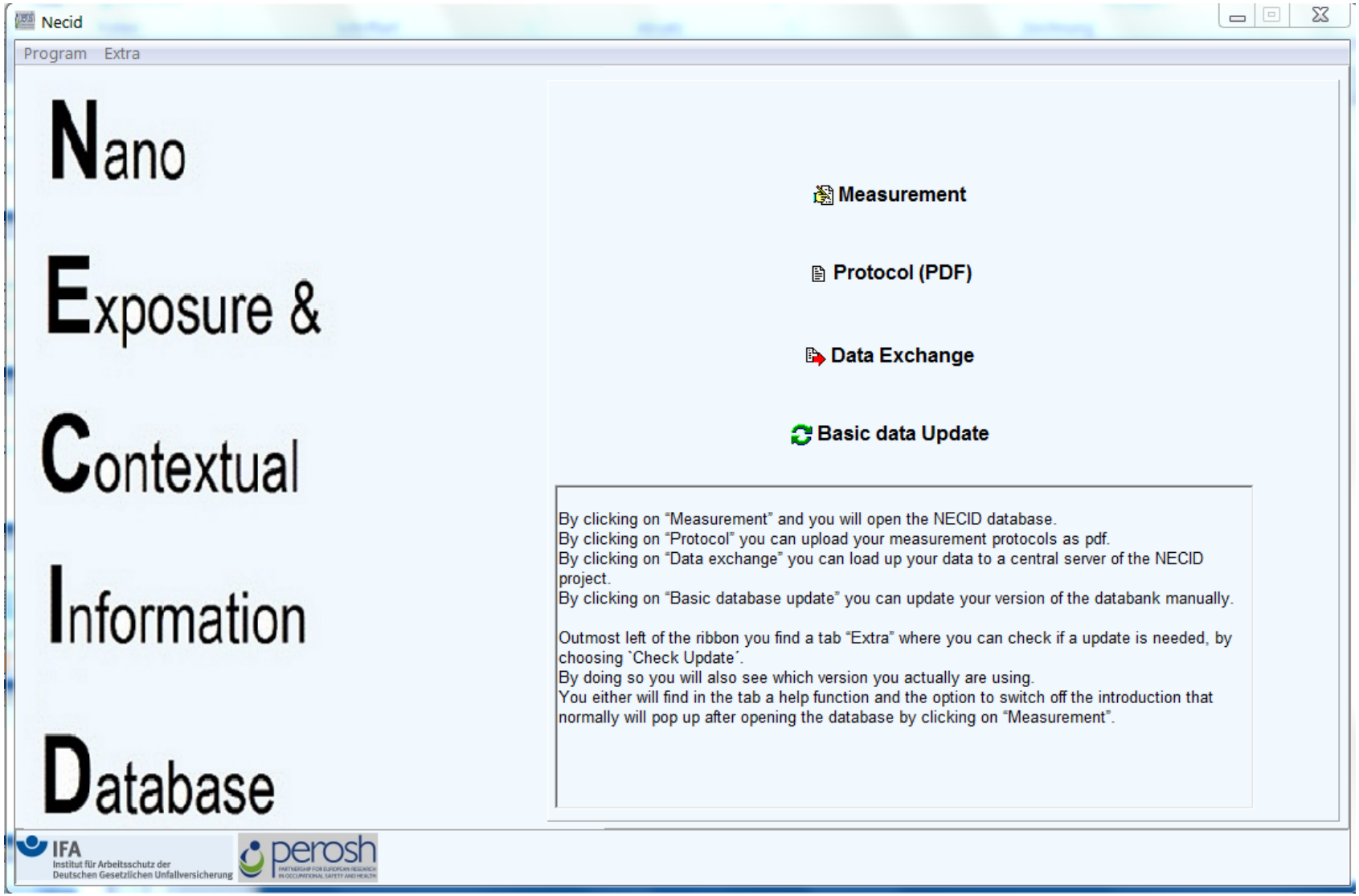
- IFA/ TNO initiative under the umbrella of PEROSH
  - Currently, actively supported by 7 institutes (IFA, TNO, HSL, FIOH, CIOP, NRCWE, INRS)
- Objectives
  - Systematic and uniform documentation of workplace exposure and contextual data
  - EU (Global, with respect to the "Global Measurement Harmonization Workgroup") wide harmonization and improvement of exposure measurements of MNM
  - Multifunctional use of NECID for research e. g.:
    - Exposure modelling, Scenario building
    - Epidemiological studies, Source of information for risk management
    - Data basis for job exposure matrix

NECID

- NECID needs to be flexible
  - Different types of exposure data (number, surface,…,material specific)
  - Different measurement strategies
  - Etc.
- This flexibility results in a complex data structure
- Vital for the success of NECID to have a process of *consensus building* on exposure and database issues within PEROSH **and** beyond

Data flow – status of work




Necid
Program
Extra
Nano
Exposure &
Contextual
Information
Database
Measurement
Protocol (PDF)
Data Exchange
Basic data Update
By clicking on "Measurement" and you will open the NECID database.
By clicking on "Protocol" you can upload your measurement protocols as pdf.
By clicking on "Data exchange" you can load up your data to a central server of the NECID project.
By clicking on "Basic database update" you can update your version of the databank manually.
Outmost left of the ribbon you find a tab "Extra" where you can check if a update is needed, by choosing `Check Update´.
By doing so you will also see which version you actually are using.
You either will find in the tab a help function and the option to switch off the introduction that normally will pop up after opening the database by clicking on "Measurement".
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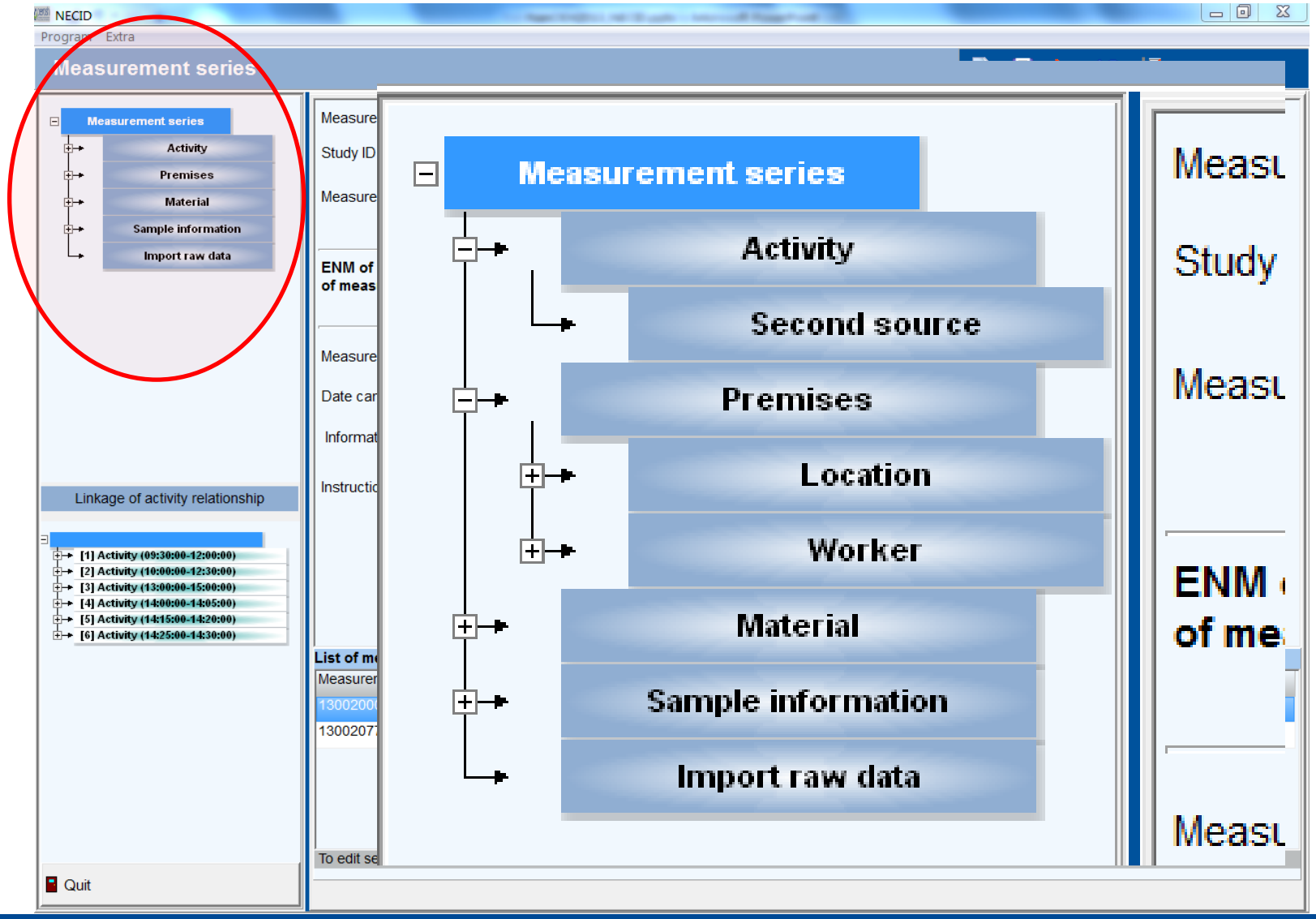
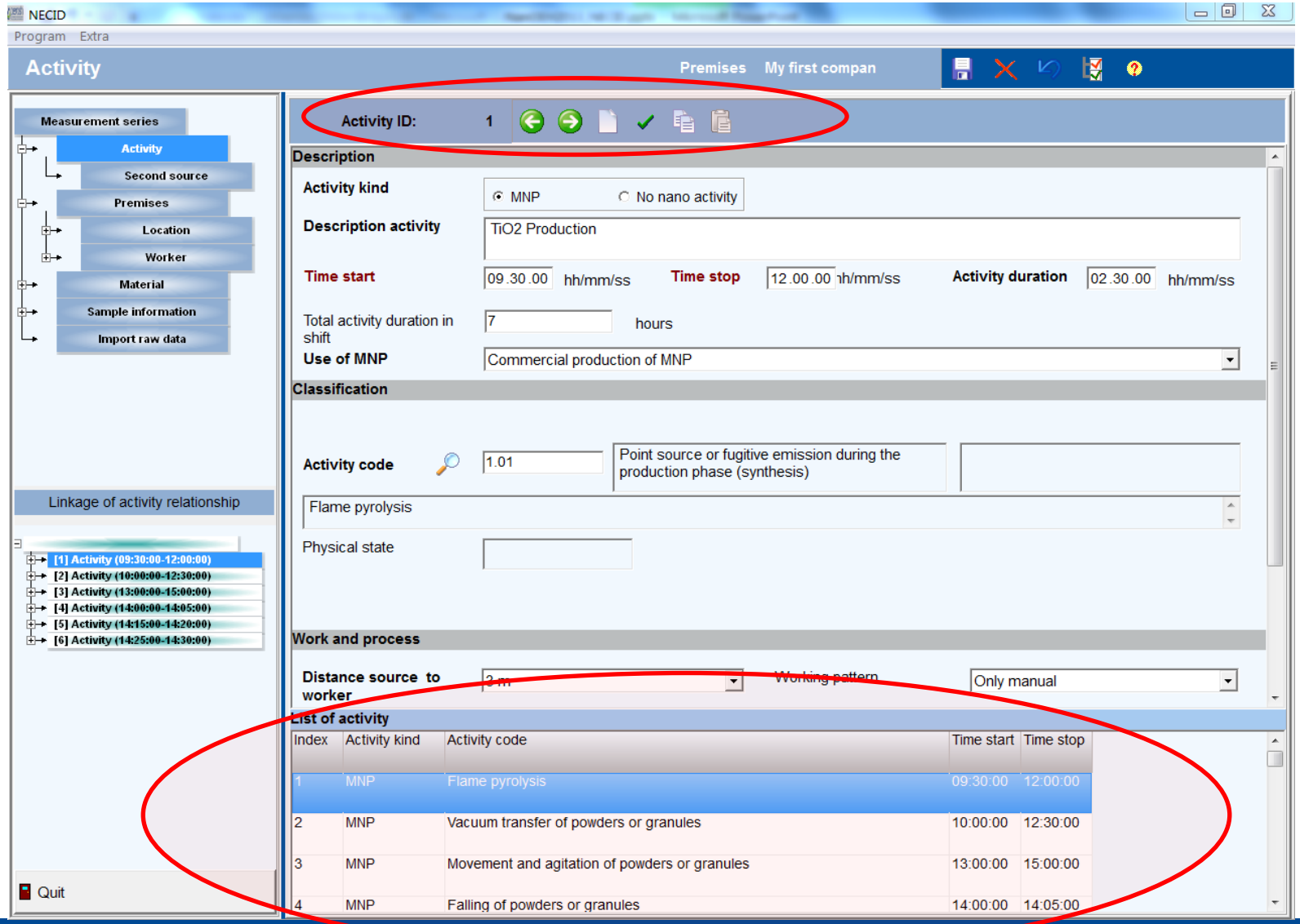
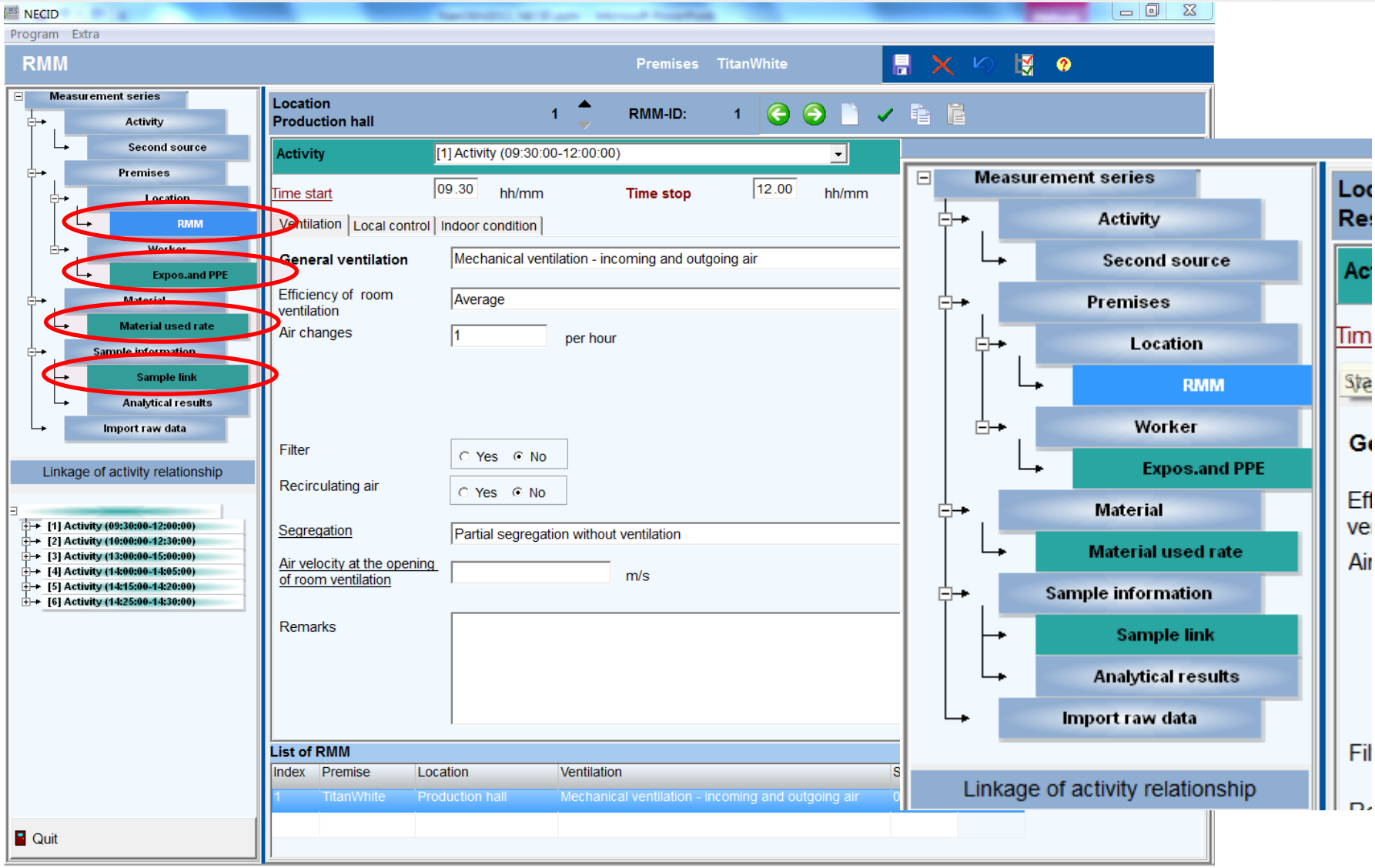

NECID
Program Extra
Measurement series
Measurement series
Activity
Premises
Material
Sample information
Import raw data
Linkage of activity relationship
[1] Activity (09:30:00-12:00:00)
[2] Activity (10:00:00-12:30:00)
[3] Activity (13:00:00-15:00:00)
[4] Activity (14:00:00-14:05:00)
[5] Activity (14:15:00-14:20:00)
[6] Activity (14:25:00-14:30:00)
Quit
Measure
Study ID
Measure
ENM of
of meas
Measure
Date car
Informat
Instructio
List of me
Measurer
13002000
13002077
To edit se
Measurement series
Activity
Second source
Premises
Location
Worker
Material
Sample information
Import raw data
Measu
Study
Measu
ENM
of me
Measu

NECID Structure

- main timeline: activites
- parallel timelines:
  - RMM
  - worker
  - sample
- all timelines linked to the activity


NECID
Program Extra
Activity
Premises My first compan
Measurement series
Activity
Second source
Premises
Location
Worker
Material
Sample information
Import raw data
Linkage of activity relationship
[1] Activity (09:30:00-12:00:00)
[2] Activity (10:00:00-12:30:00)
[3] Activity (13:00:00-15:00:00)
[4] Activity (14:00:00-14:05:00)
[5] Activity (14:15:00-14:20:00)
[6] Activity (14:25:00-14:30:00)
Quit
Activity ID: 1
Description
Activity kind
MNP
No nano activity
Description activity
TiO2 Production
Time start
09.30.00 hh/mm/ss
Time stop
12.00.00 hh/mm/ss
Activity duration
02.30.00 hh/mm/ss
Total activity duration in shift
7
hours
Use of MNP
Commercial production of MNP
Classification
Activity code
1.01
Point source or fugitive emission during the production phase (synthesis)
Flame pyrolysis
Physical state
Work and process
Distance source to worker
3 m
Working pattern
Only manual
List of activity
Index
Activity kind
Activity code
Time start
Time stop
1 MNP Flame pyrolysis 09:30:00 12:00:00
2 MNP Vacuum transfer of powders or granules 10:00:00 12:30:00
3 MNP Movement and agitation of powders or granules 13:00:00 15:00:00
4 MNP Falling of powders or granules 14:00:00 14:05:00


NECID
Program Extra
RMM
Premises TitanWhite
Measurement series
Activity
Second source
Premises
Location
RMM
Worker
Expos.and PPE
Material
Material used rate
Sample information
Sample link
Analytical results
Import raw data
Linkage of activity relationship
[1] Activity (09:30:00-12:00:00)
[2] Activity (10:00:00-12:30:00)
[3] Activity (13:00:00-15:00:00)
[4] Activity (14:00:00-14:05:00)
[5] Activity (14:15:00-14:20:00)
[6] Activity (14:25:00-14:30:00)
Quit
Location
Production hall
1
RMM-ID: 1
Activity
[1] Activity (09:30:00-12:00:00)
Time start
09.30
hh/mm
Time stop
12.00
hh/mm
Ventilation
Local control
Indoor condition
General ventilation
Mechanical ventilation - incoming and outgoing air
Efficiency of room ventilation
Average
Air changes
1
per hour
Filter
Yes No
Recirculating air
Yes No
Segregation
Partial segregation without ventilation
Air velocity at the opening of room ventilation
m/s
Remarks
List of RMM
Index Premise Location Ventilation
1 TitanWhite Production hall Mechanical ventilation - incoming and outgoing air

NECID

Program Extra

RMM Premises TitanWhite

Measurement series
- Activity
- Second source
- Premises
  - Location
    - RMM
  - Worker
    - Expos.and PPE
- Material
  - Material used rate
- Sample information
  - Sample link
  - Analytical results
- Import raw data

Linkage of activity relationship
- [1] Activity (09:30:00-12:00:00)
  - [1.1] RMM (09:30-11:30)
  - [1.2] RMM (11:30-12:00)
  - [3.1] Expos.and PPE (09:30:00-12:00:0
  - [1.1] Sample link (09:00:00-12:30:00)
  - [2.1] Sample link (08:55:00-12:45:00)
  - [3.1] Sample link (08:30:00-13:00:00)
  - [4.1] Sample link (19:00:00-07:00:00)
- [2] Activity (10:00:00-12:30:00)
- [3] Activity (13:00:00-15:00:00)
- [4] Activity (14:00:00-14:05:00)
- [5] Activity (14:15:00-14:20:00)
- [6] Activity (14:25:00-14:30:00)

Quit

Location
Production hall 1 RMM-ID: 1

Activity [1] Activity (09:30:00-12:00:00) Create new activity

Time start 09:30 hh/mm Time stop 11:30 hh/mm

Ventilation | Local control | Indoor condition

General ventilation: Mechanical ventilation - incoming and outgoing air

Efficiency of room ventilation: Average

Air changes: 1 per hour

Filter: Yes No

Recirculating air: Yes No

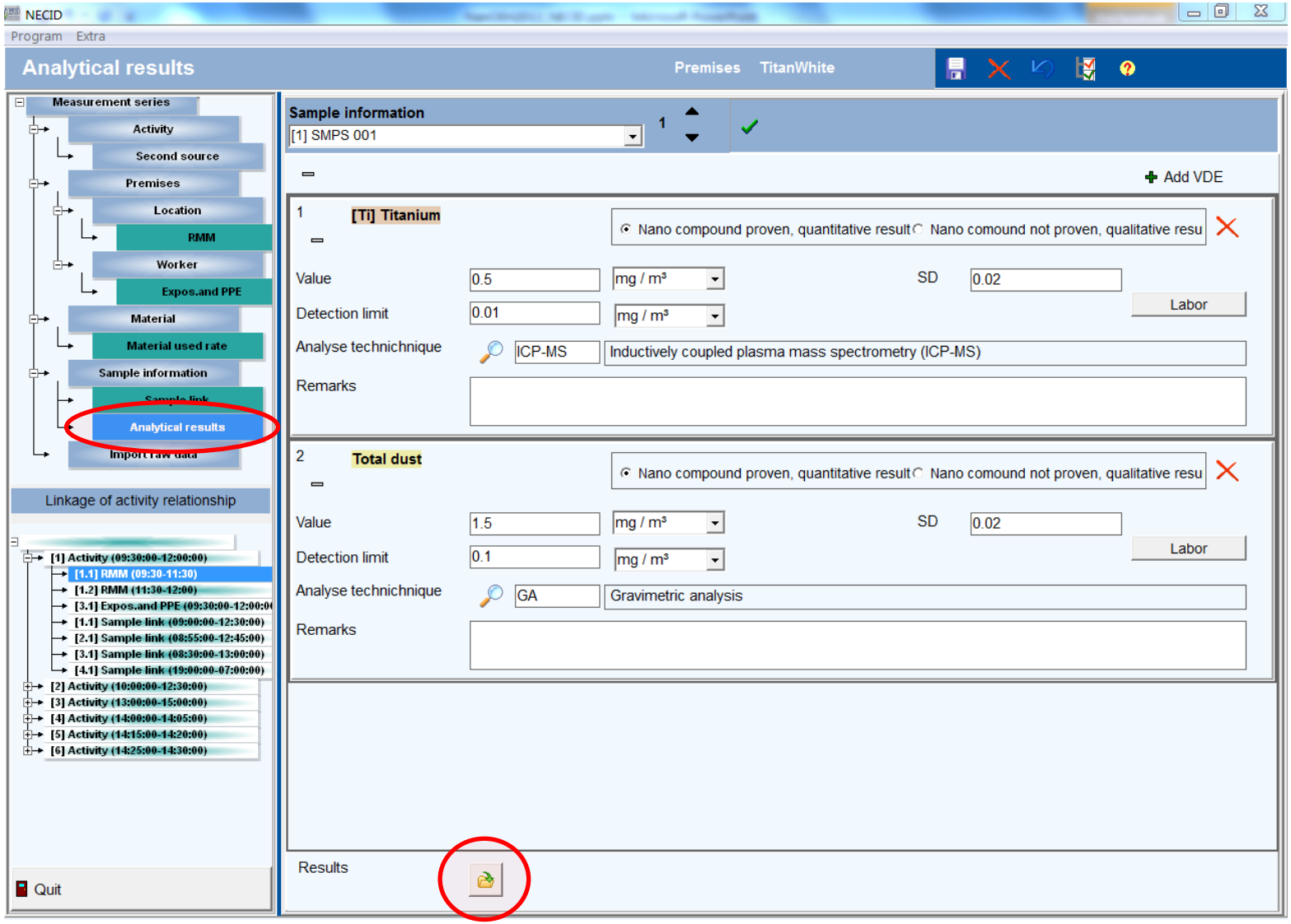
Segregation: Partial segregation without ventilation

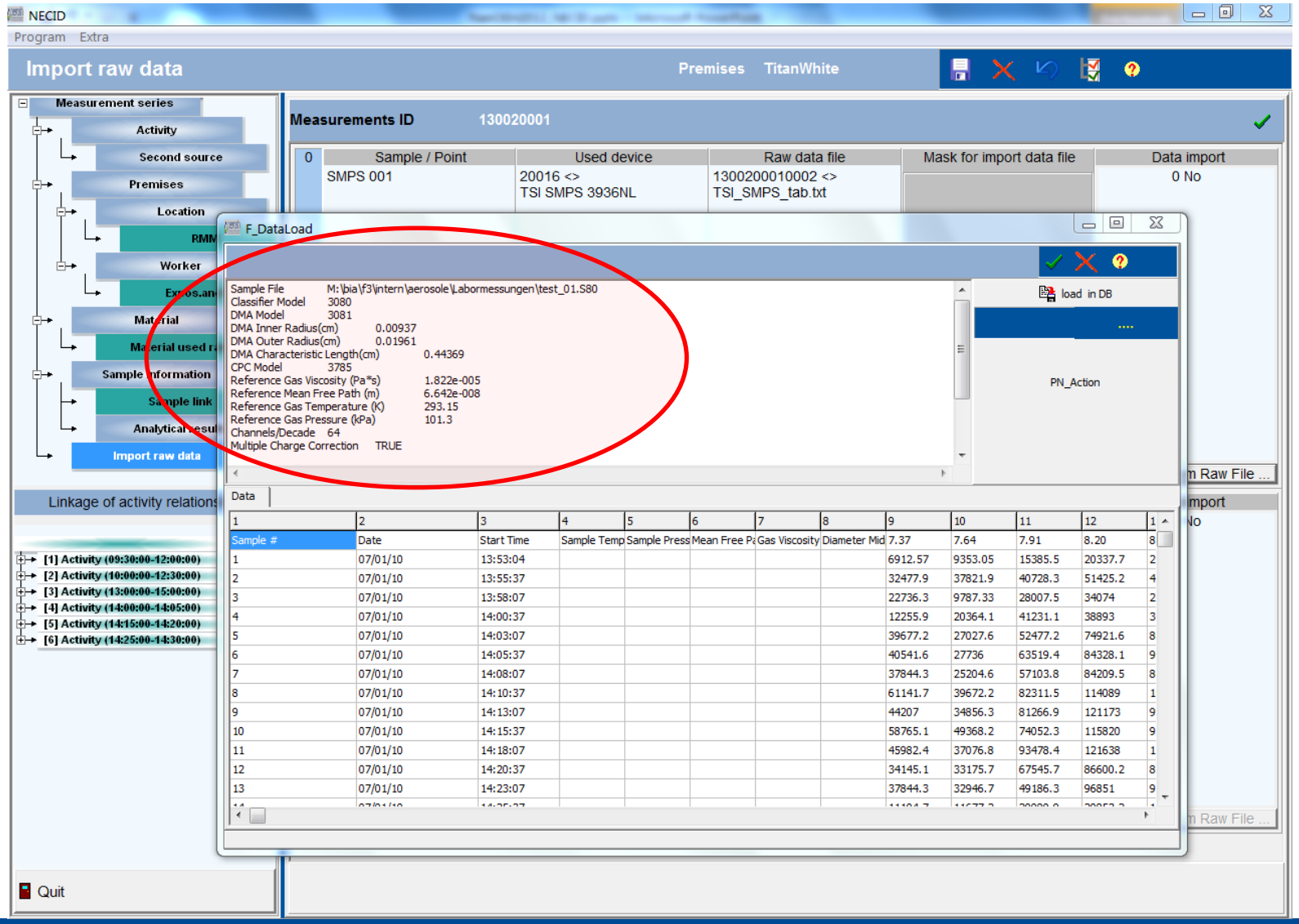
Air velocity at the opening of room ventilation: m/s

Remarks

List of RMM

Index	Premise	Location	Ventilation	Start	Stop
1	TitanWhite	Production hall	Mechanical ventilation - incoming and outgoing air	09:30:00	11:30:00
2	TitanWhite	Production hall	None ventilation	11:30:00	12:00:00


NECID
Program Extra
Analytical results
Premises TitanWhite
Measurement series
Activity
Second source
Premises
Location
RMM
Worker
Expos.and PPE
Material
Material used rate
Sample information
Analytical results
Linkage of activity relationship
[1] Activity (09:30:00-12:00:00)
[1.1] RMM (09:30-11:30)
[1.2] RMM (11:30-12:00)
[3.1] Expos.and PPE (09:30:00-12:00:0
[1.1] Sample link (09:00:00-12:30:00)
[2.1] Sample link (08:55:00-12:45:00)
[3.1] Sample link (08:30:00-13:00:00)
[4.1] Sample link (19:00:00-07:00:00)
[2] Activity (10:00:00-12:30:00)
[3] Activity (13:00:00-15:00:00)
[4] Activity (14:00:00-14:05:00)
[5] Activity (14:15:00-14:20:00)
[6] Activity (14:25:00-14:30:00)
Quit
Sample information
[1] SMPS 001
1
Add VDE
1 [Ti] Titanium
Nano compound proven, quantitative result
Nano comound not proven, qualitative resu
Value 0.5 mg / m³ SD 0.02
Detection limit 0.01 mg / m³
Labor
Analyse technichnique ICP-MS Inductively coupled plasma mass spectrometry (ICP-MS)
Remarks
2 Total dust
Nano compound proven, quantitative result
Nano comound not proven, qualitative resu
Value 1.5 mg / m³ SD 0.02
Detection limit 0.1 mg / m³
Labor
Analyse technichnique GA Gravimetric analysis
Remarks
Results


NECID
Program Extra
Import raw data
Premises TitanWhite
Measurement series
Activity
Second source
Premises
Location
Worker
Material
Import raw data
Linkage of activity relations
[1] Activity (09:30:00-12:00:00)
[2] Activity (10:00:00-12:30:00)
[3] Activity (13:00:00-15:00:00)
[4] Activity (14:00:00-14:05:00)
[5] Activity (14:15:00-14:20:00)
[6] Activity (14:25:00-14:30:00)
Quit
Measurements ID 130020001
Sample / Point
Used device
Raw data file
Mask for import data file
Data import
SMPS 001
20016 <>
TSI SMPS 3936NL
1300200010002 <>
TSI_SMPS_tab.txt
0 No
F_DataLoad
Sample File M:\bia\f3\intern\aerosole\Labormessungen\test_01.S80
Classifier Model 3080
DMA Model 3081
DMA Inner Radius(cm) 0.00937
DMA Outer Radius(cm) 0.01961
DMA Characteristic Length(cm) 0.44369
CPC Model 3785
Reference Gas Viscosity (Pa*s) 1.822e-005
Reference Mean Free Path (m) 6.642e-008
Reference Gas Temperature (K) 293.15
Reference Gas Pressure (kPa) 101.3
Channels/Decade 64
Multiple Charge Correction TRUE
load in DB
PN_Action
Data
Sample # Date Start Time Sample Temp Sample Press Mean Free P Gas Viscosity Diameter Mid
1 07/01/10 13:53:04 6912.57 9353.05 15385.5 20337.7
2 07/01/10 13:55:37 32477.9 37821.9 40728.3 51425.2
3 07/01/10 13:58:07 22736.3 9787.33 28007.5 34074
4 07/01/10 14:00:37 12255.9 20364.1 41231.1 38893
5 07/01/10 14:03:07 39677.2 27027.6 52477.2 74921.6
6 07/01/10 14:05:37 40541.6 27736 63519.4 84328.1
7 07/01/10 14:08:07 37844.3 25204.6 57103.8 84209.5
8 07/01/10 14:10:37 61141.7 39672.2 82311.5 114089
9 07/01/10 14:13:07 44207 34856.3 81266.9 121173
10 07/01/10 14:15:37 58765.1 49368.2 74052.3 115820
11 07/01/10 14:18:07 45982.4 37076.8 93478.4 121638
12 07/01/10 14:20:37 34145.1 33175.7 67545.7 86600.2
13 07/01/10 14:23:07 37844.3 32946.7 49186.3 96851

Status of development

- Test version of data collection module is ready
- Data import of direct reading devices possible (for some devices)
- Reporting in PDF-file (currently)

Planned:

- Software for external partners (test phase starts this year, e.g. SCAFFOLD, MARINA))
- Flexible export in ASCII-format
- enable the central server (for PEROSH)
- Data import for most devices

Outlook

- multifunctional calculation and comparison tool