HAMILTON

ArcAir Data Modeling

Operating Instructions



Hamilton Warranty

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GENERAL INFORMATION

1 General Information

1.1 Intended Use

The Arc system consist of Arc sensors, the ArcAir software application, and accessories. The Arc portfolio has been complemented by ArcAir Data Modeling Software (AADM). AADM is designed for use with the Incyte Arc Expert sensors. The sophisticated multivariate data analysis of the AADM software builds a mathematical model from historical process data, that helps correlate the Incyte Arc permittivity signal with real time viable cell density values. With a successful model implementation, an Incyte Arc may generate a continuous correlation of offline cell count throughout the duration of a bioprocess, enabling automation and comparisons to historical cell count measurements.

1.2 About this Operating Instructions

These Operating Instructions are intended to support the installation, operation, and utilization of the AADM software in conjunction with data generated by Incyte Arc using ArcAir. For this purpose, a description of the different components and a short Operation Instructions are given first. The Operation Instructions describe both the hardware (Incyte Arc) and the software components (AADM and ArcAir), with the focus on the operation of the software. After review of the user manual, the user will be able to install software, utilize hardware to generate data, upload data to AADM, and generate a multivariate model using AADM and transfer the AADM model onto an Incyte Arc sensor. The user is responsible for taking suitable precautions in the event of a product failure.

This Operating Instruction is based on the ArcAir Data Modeling Version 2021.08.2429.10

Following information are highlighted within this document:

NOTE: Important instructions or interesting information.

⚠ ATTENTION! Essential information for avoiding personal injury or damage to the equipment.

1.3 Operation recommendation

The current version of the AADM is designed for the following applications:

- Bioprocesses that utilize animal cells (e.g. CHO, Sf9, …)
- Recommended use of the AADM model only works for identical and reproducible processes as it was built with
  - Pilot or production scale
  - Bioreactor process conditions and hardware that are consistent
- To build an AADM model at least three runs are required. A software supported statistical validation of the model is possible when using four runs
- Data required for the model must be generated from the Incyte Arc Expert with the scan feature active. Dual frequency data is not sufficient for model development
- A usage of the Inoculation function is highly recommended. On offset compensation with the Mark Zero is reasonable as well.

1.4 Disclaimer

The model building functionality has been successfully tested by Hamilton with a variety of typical cell culture processes. Nevertheless, the ability to detect unexpected changes of the process with the AADM model may be limited by an individual process and should be validated prior to deployment.

The model quality is derived from statistical analysis of available process data. Model quality should be used only as a recommendation of overall statistical rigor. It is the responsibility of the user to set up acceptance criteria on the correlation performance of the generated models and to validate these criteria with this process data.

For consistent model quality, it is recommended to always extend the model with current process data. The user is responsible for this maintenance.

Model transferability between Incyte Arc sensors cannot be guaranteed. Validation of model transfer using data generated by transfer intended sensor can improve transfer confidence.

2 Liability

The liability of Hamilton Bonaduz AG is detailed in the document «General Terms and Conditions of Sale and Delivery» Hamilton is expressly not liable for direct or indirect losses arising from the use of the products. It must in particular be insured in this conjunction that malfunctions can occur on account of the inherently limited useful life of products contingent upon their relevant applications. The user is responsible for the calibration, maintenance and regular replacement of the products. In the case of critical product applications, Hamilton recommends using redundant measuring points in order to avoid consequential damages. The user is responsible for taking suitable precautions in the event of a product failure.

3 Product Description

The permittivity measurement represents the viable bio volume. This viable cell volume (VCV) can be directly proportional to the viable cell density (VCD) in the exponential growth phase. To have the viable cell count available online, a transformation based on the viable bio volume is possible with a linear correlation. This can change when the cells enter the stationary growth phase. One of the reasons can be, that the number of viable cells remains the same while the cells swell towards the end of their life cycle (initiation of apoptosis), which can be detected with the measuring principle of the Incyte Arc sensor and leads to an increase in permittivity (see left-hand side of Figure 1).

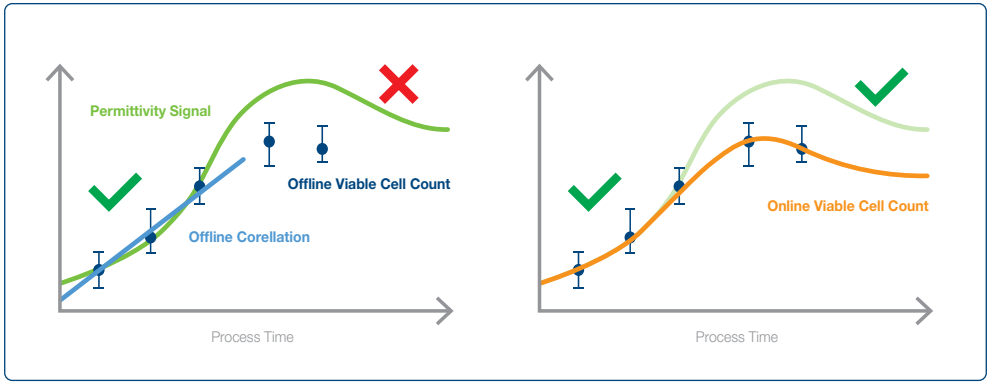


Figure 1: Schematic illustration of the problem of linear correlation vs. the use of ArcAir Data modeling for correlation of inline with offline data.

An improvement of the correlation can be achieved by using multiple frequencies and multivariate data analysis tools. ArcAir Data Modeling is Hamilton's tool to develop a multifrequency model to improve correlation strength of viable cell counts throughout the entire bioprocess (see Figure 1 right hand side).

3.1 Operating Principle

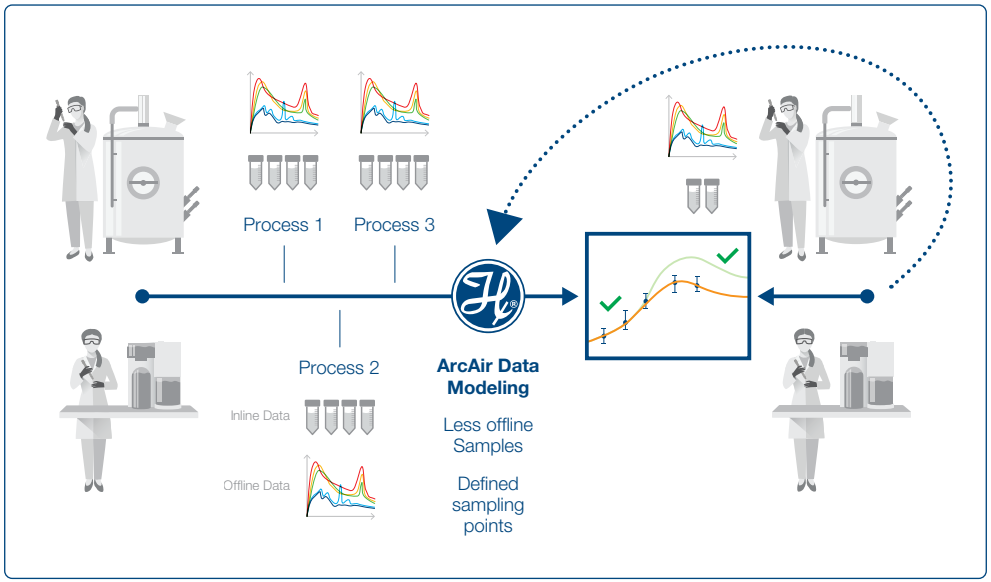


Figure 2: Attempt and workflow of AADM

The AADM Software is an addition to the sensors of the Incyte Arc Expert series. The process data of several cultivations (switched on scan) can be transferred to the AADM Software together with the corresponding offline data of the cell density measurement. In the software, the data can be checked for reproducibility and then used for model building. Once a model is built, the performance of the model is provided with a model quality metric. After successful validation, the model is transferred onto an Incyte Arc sensor via ArcAir with an export file and can be used for real-time correlation of cell density. An overview of the process workflow is shown in Figure 2.

PRODUCT DESCRIPTION

3.2 Combination with Arc Portfolio

3.2.1 Incyte Arc

The Incyte Arc sensor is designed to provide continuous real-time measurement of permittivity in a bioprocess. Permittivity is directly proportional to viable cell biovolume and is correlated to viable cell density in many applications. The measurement is not influenced by media composition or the presence of micro carriers, allowing for a robust measurement in both adherent and suspension-based bioprocesses. Additionally, dead cells and cellular debris do not contribute to the permittivity measurement, providing an independent measurement of viable cell density within a culture.

Incyte Arc will perform in many mammalian, insect, bacterial, and fungal systems, depending upon the cell concentration at inoculation.

Permittivity	0 - 700 pF/cm
Animal	5 x 10^5 - 8 x 10^9 cells/ml
Bacteria and Yeast	5 - 200 g/l

3.2.2 ArcAir

The ArcAir application offers efficient and safe communication for monitoring, validating, management and recording of sensors. It also offers a user management. Combining the reliability of Incyte Arc sensors with the power, convenience and portability of mobile devices, users benefit from configuration in the laboratory, along with product calibrations (Mark and Clear Zero) in the process environment, as well as Sensor Verification. The additional reporting functionality offers management of reports for validation, verification, configuration, communication and user profiles within the GMP regulatory requirements for all Arc sensors. ArcAir offers an overview of all the Arc sensors in the operating environment, through computer, tablet and mobile phone. The mobile version only supports the most important workflows - data recording and display of the Experiment is not available.

A detailed explanation can be found in the ArcAir System Manual (Ref 10071115).

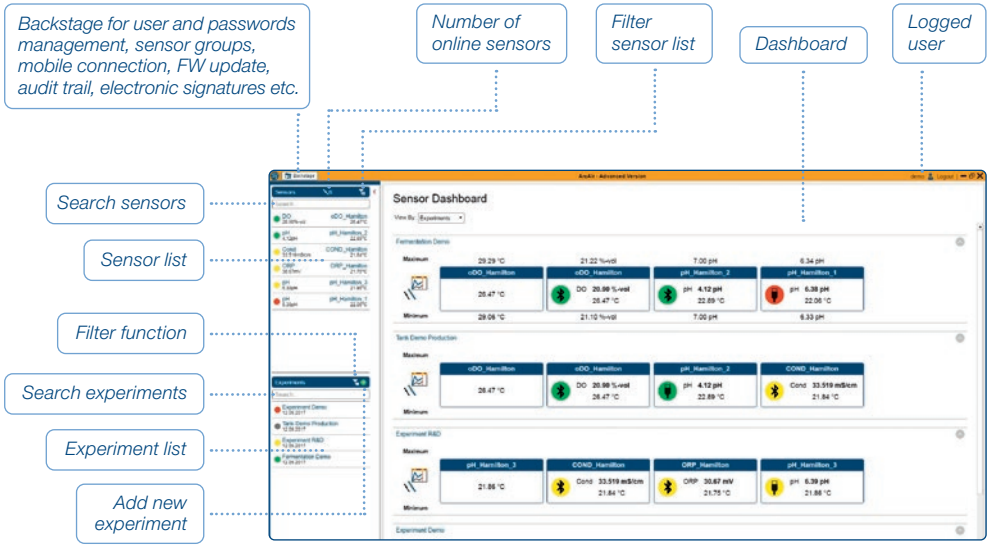


Figure 3: ArcAir Software application on computer



Figure 4: The ArcAir application on mobile

PRODUCT DESCRIPTION

There are two different ArcAir versions:

	ArcAir Basic	ArcAir Advanced
Availability	Free download from Hamilton website or App Store	Update from Basic version via in-App purchase in the App Store or through the PC via Arc Wireless Converter BT (Ref 242333)
Intended for	PC/Mobile	PC/Mobile
Functions	Measuring, Sensor Status, Experiment function, Configuration, Firmware update	Full incl. Verification, Communication Validation, User Management, Audit Trail, Report functionality

3.2.3 Accessories

The Incyte Arc Sensor can be combined with different hardware accessories from the Arc portfolio. These are related to specific applications. All listed accessories should be provided for each Incyte Arc sensor scheduled in a bioprocess. Our Hamilton team is looking forward to supporting you in finding the accessories that are needed for a complete application with the Incyte Arc Sensor.

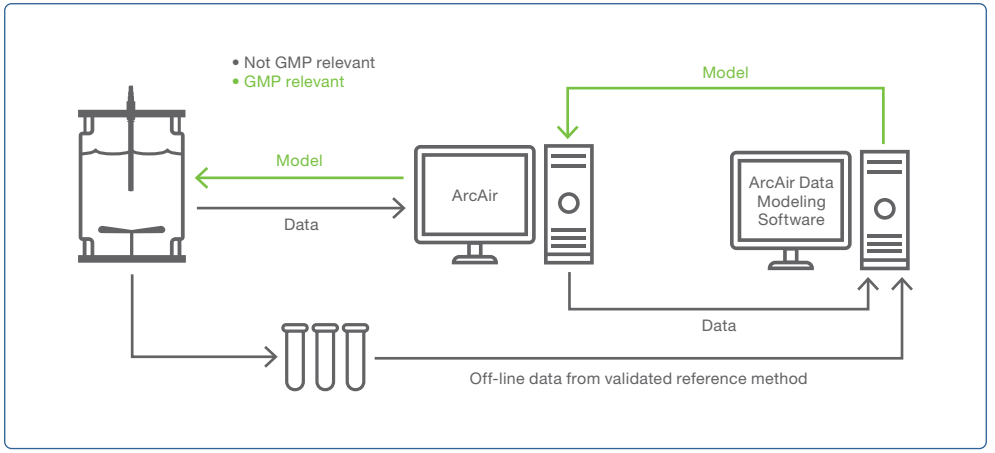
An overview is given here.

- Wireless
  - Arc Wi 2G Adapter BT (Ref 243470)

    4-20 mA (Use Sensor Data Logging if the signal is considered for AADM), Modbus and Bluetooth connection
  - Arc Wi 1G Adapter BT (Ref 242360)

    Modbus and Bluetooth connection, recommended with Arc Modbus OPC Converter (Ref 10089359)
- Wired/Power - External Power supply with Arc USB Power Cable (Ref 243490-01 or -02)
  - Modbus

A



B

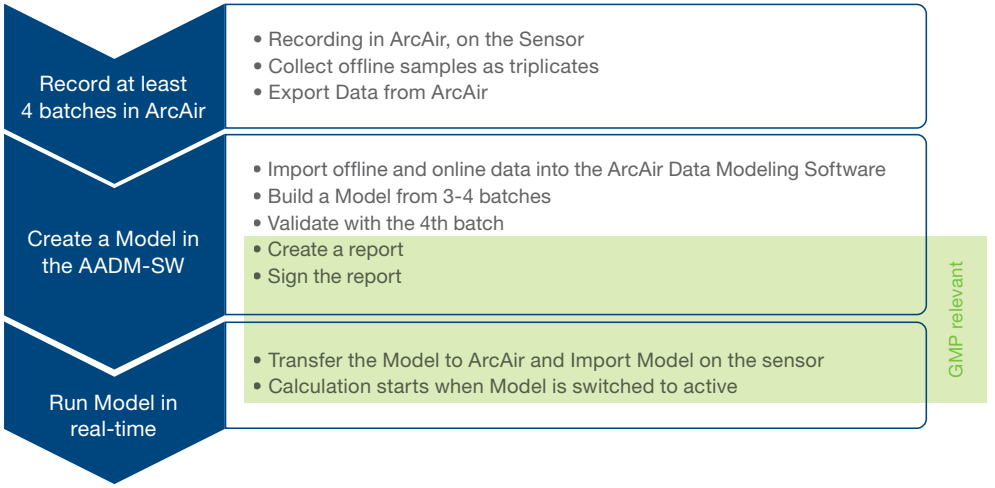


Figure 5: ArcAir Data Modeling Overview (A) and Procedure (B)

4 Installation of Software

4.1 Installation of ArcAir and ArcAir Data Modeling

NOTE: The Software is provided with Incyte Arc Expert.

1) Fill out the contact form for the ArcAir Data Modeling Software at the Hamilton website. The Hamilton Customer Support Team will provide the software afterwards.
2) Unpack the zip file
3) Make sure the computer has Admin rights to install the software
4) Execute the installation file and follow the installation instructions

NOTE: Following minimal system requirements are needed to run the software:

Operating System	Windows 10, 8.1, 8, or 7 For Windows 7, the latest service pack and other updates are required to be installed 64 bit
CPU	Intel Core i5 or comparable AMD processor 2 cores 64 bit
RAM	4 GB
Hard drive	4 GB free space before installation SSD recommended

NOTE: The Software is designed to run on windows only.

5 Operating ArcAir Data Modeling

5.1 Software Overview

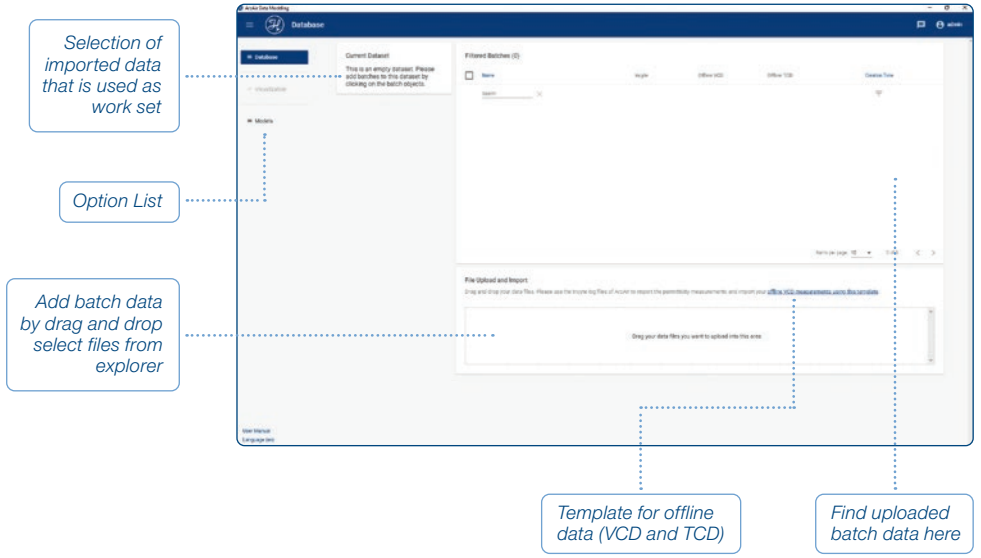


Figure 6: Dashboard and starting Screen of AADM

Find the list of options on the left-hand side on the *Dashboard* (see Figure 6). Listed here are *Database*, *Visualization* and *Models*. If the *Current Dataset* is empty, the software is asking to add batches. If batch data has been added, they can be found in the list of *Filtered Batches* on the right-hand side. At the bottom right corner of the screen, inline and offline batch data can be added by drag and drop or by double click and navigation in the file explorer.

5.2 Import Data

To build a model with the AADM Software, the inline scan data of the Incyte Arc is needed as well as the offline data measured by the customer with different devices. Initially, these data packages are read into the software separately. The software merges these data after the import. Therefore, it is necessary that the Batch names of the imported Incyte scan and offline data match each other (see Figure 7). The file can now be uploaded to the software via drag and

drop in the *File Upload and Import* section. A pop-up message with a green box will indicate a successful import of the data (Figure 9). The pop-up window will be red if the import fails (Figure 10). An overview of which Incyte data (inline data) and which offline data has been uploaded is displayed in the upper part of the software via the small check marks.

A description of how the data is processed in the AADM software and how it is then transferred to the Incyte Arc sensor is described in this chapter.

Incyte Arc Data

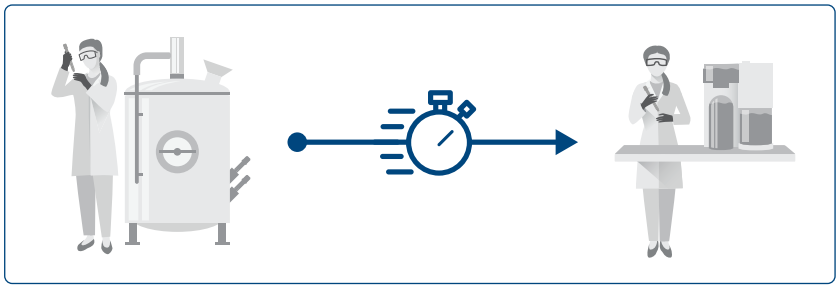
	A
1	[[HEADER]]
2	Batch name: Run1
3	Creation Date: 17.05.2021 12:06:00
4	Sampling Time: 60s
5	User: Hamilton AG
6	Status: OK
7	Sensor serial number: 1111
8	Zero: 0Cell Density unit/factor: 1
9	Cell Type Mode: Animal; fc: 999; fhigh: 9995; Moving Average: 64

Offline Data

	A	B	C	D
1	Please insert the name of the batch, the absolute timestamps (dd.mm			
2				
3	Batch Name:	Run1		
4	Date Time	TCD (g/l)		
5	20.01.2017 12:00	5.40	5.50	5.90
6	20.01.2017 13:00	6.90	7.15	7.30
7	20.01.2017 14:30	7.70	7.85	7.80

Figure 7: Example of file name for data import

5.2.1 Information about the Offline Data

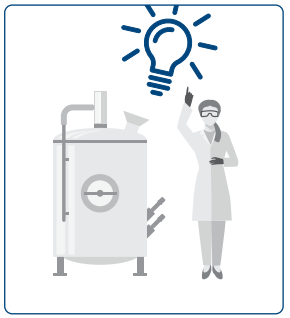


The offline data measured by users, using different methods and devices, are provided to the AADM software via a uniform template. This template can be downloaded from the link in the *File Upload and Import* and can be filled in afterwards (see Figure 8). It is possible to specify a triplet of offline data. This information is displayed in figures and the report as error bars.

The offline measurement can be specified as total cell density and viable cell density. The units cells/ml; OD; PCV and g/l are available for this.

To ensure a good outcome and a good performing AADM model, it is highly recommended to take offline at least samples every 24h. For Fed-batch cultivation a sampling before and after the feeding is recommended to improve the AADM-model performance.

5.2.2 Information about the Incyte Arc Data



Before an experiment is started make sure the *Batch name* in the *Experiment* is the name that will be use for the AADM Data import. Switch on the Scan once the *Experiment* is started. Use *Mark Zero* and *Inoculation* at the appropriate timepoints, this is important to ensure a proper modeling procedure.

After finishing an *Experiment* in ArcAir export the data and store it on the AADM computer. The data of this document should not be further processed as the software is designed to work with the raw data.

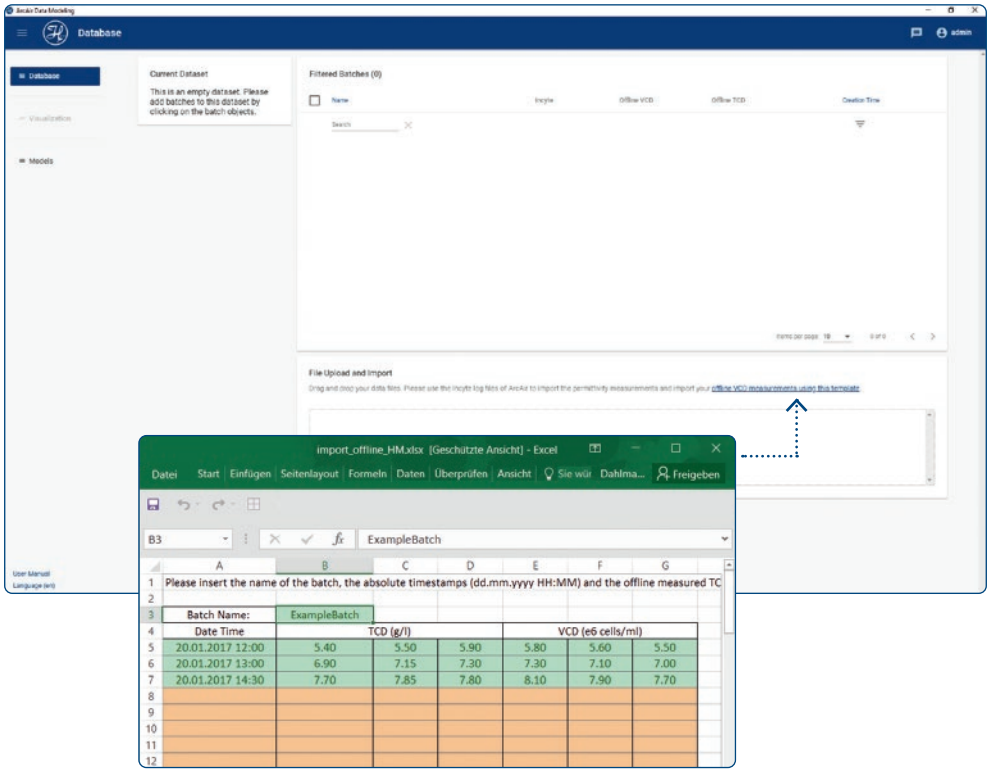


Figure 8: Example Screen of the ArcAir Data Modeling Dashboard with the datasheet for the offline samples

Incyte Arc Sensors have the ability to log data on the internal sensor memory. It is highly recommended to log process data on ArcAir software (Experiment Function) and on Sensor head (Sensor data Logging) in parallel. This way the process data will be secured against unexpected data lost.

NOTE: The inoculation time has to be marked during data recording (Inoculation Button) as well as offset compensation by Mark Zero to ensure a proper modeling procedure.

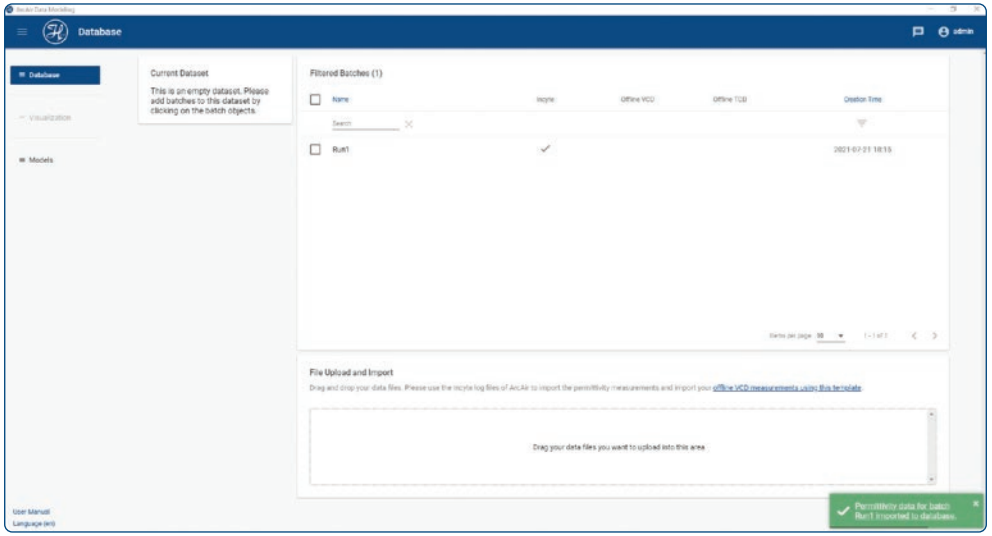


Figure 9: Example screen of a successful data import

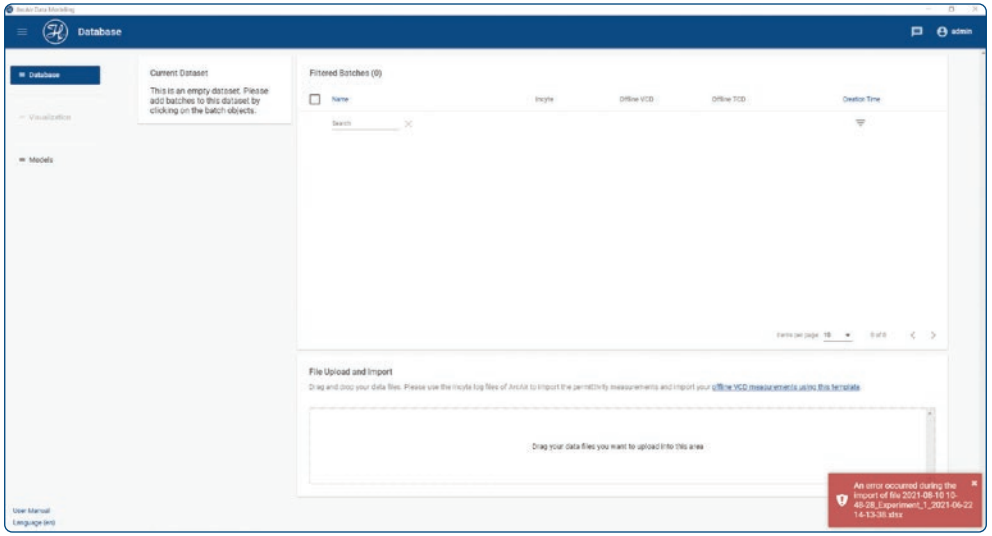


Figure 10: Example screen of a failed data import

5.3 Add Batch Data to Current Dataset

AADM can hold a large amount of data. It is possible to keep a collection of historical process data. Since not all data should be worked with at the same time, a selection can be chosen.

Select at least 3-4 batches from the list of *Filtered Batches*, after successful import, and click *Add to current Dataset* to add the batch data to the working area and create a AADM-model. Find the selection of Batch data in the window of *Current Dataset* see Figure 11.

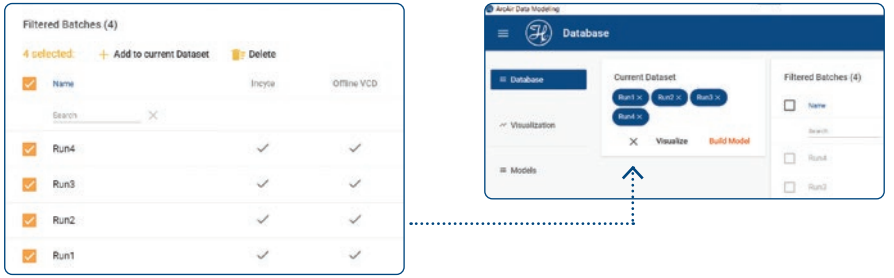


Figure 11: Add selection of Batch Data to Current Dataset

5.4 Visualization of Imported Data

To compare process data among each other, to make sure that the data sets are reproducible and do not contain outlier data, AADM provides a visualization tool.

Click *Visualize* in the section of *Current Dataset* or navigate to *Visualization* in the option list.

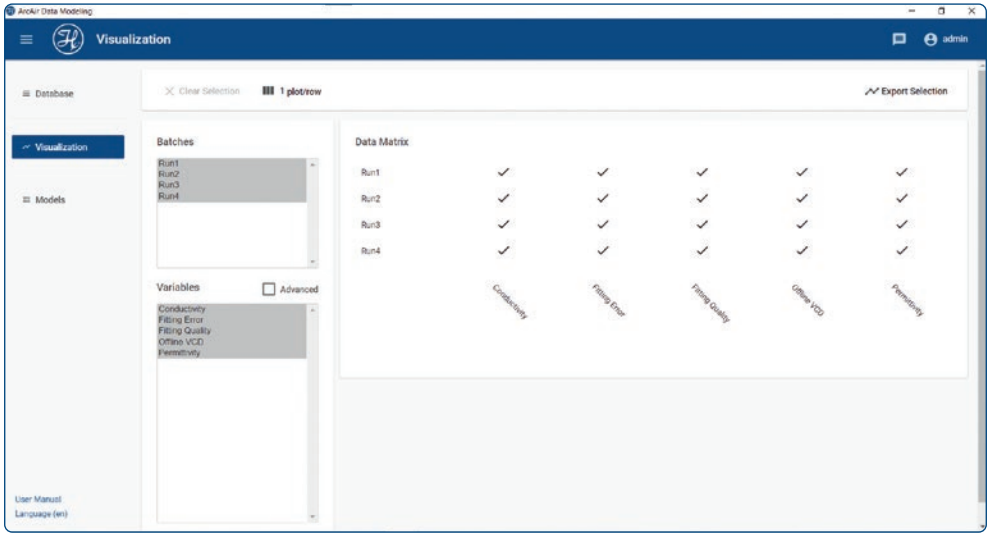


Figure 12: Visualization overview in AADM

Find the imported process data in *Batches* and a selection of process parameter in *Variables*. Enable the view on additional parameters like Alpha, fc or the permittivity of all 17 frequencies by ticking the *Advanced* check box (see Figure 12).

Clicking on the variables or a vertical selection to see a graph of the selected variable and the data from different batches for direct comparison (find an example in Figure 13).

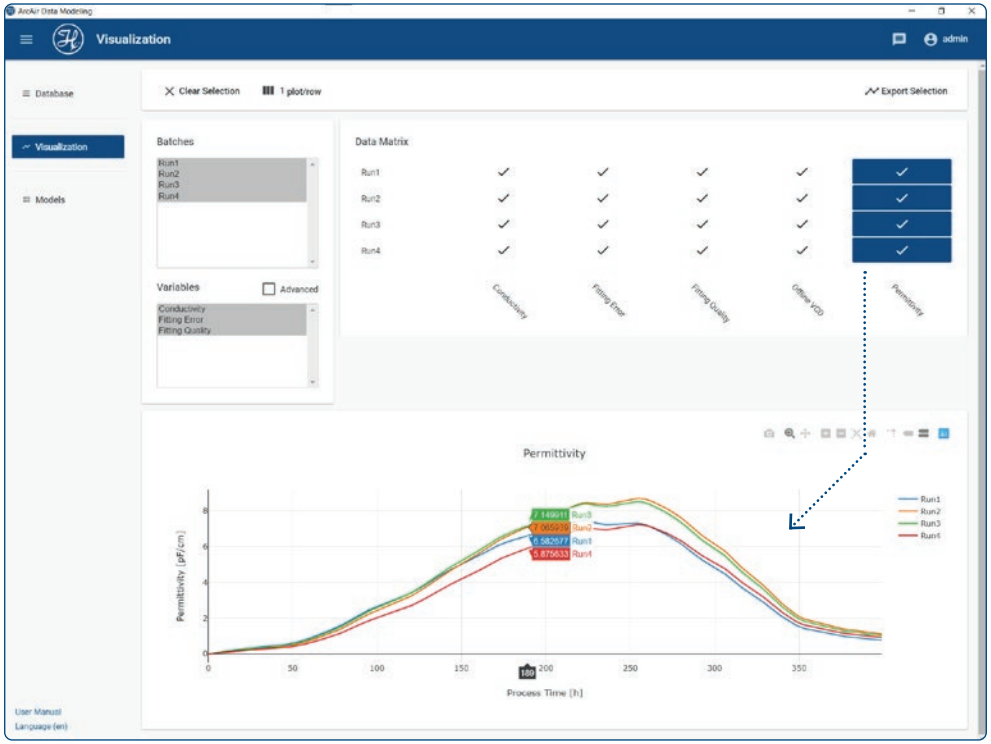


Figure 13: Vertical selection of variables to compare runs among each other

Clicking on the Batch Name (e.g. Run1) or a horizontal selection to see a graph of the Batch and multiple variables to the details of the run (find an example in Figure 14).

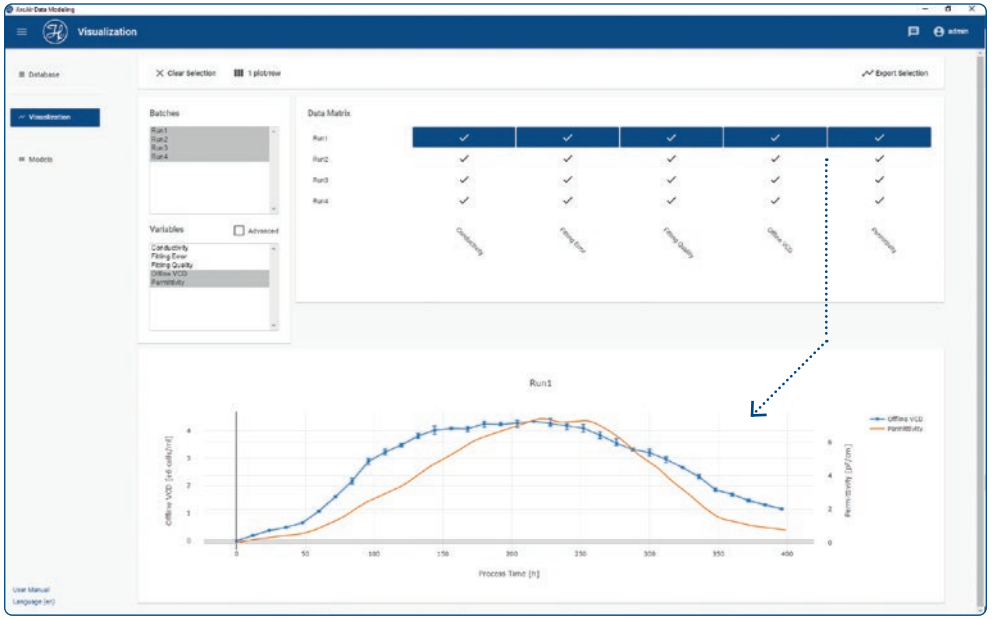


Figure 14: horizontal selection of variables to see details of one run

Combine any selections to see a perfect combination of overview and details of the process data (see Figure 15).

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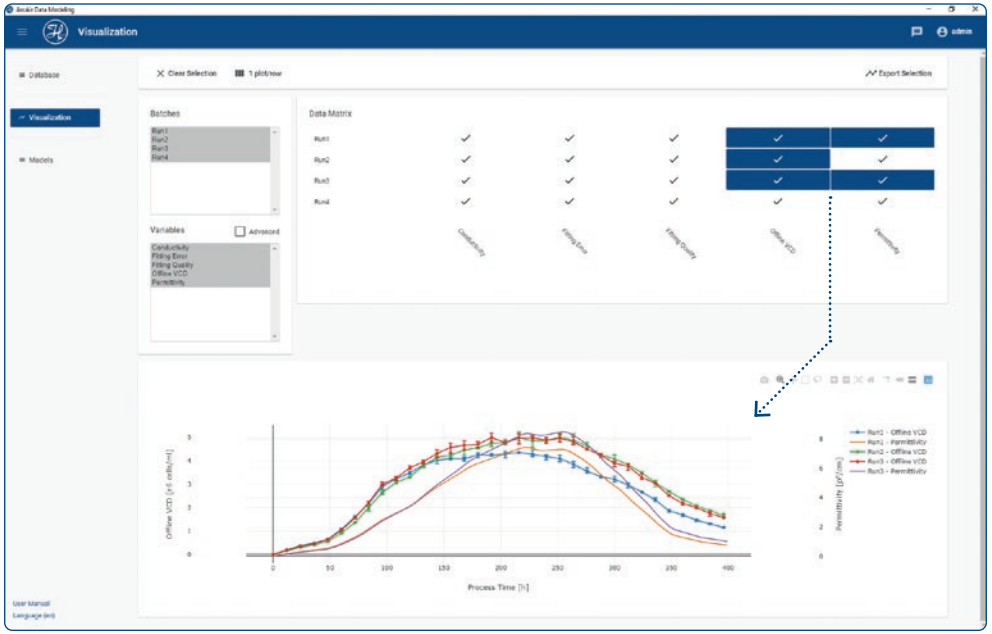


Figure 15: combination of horizontal and vertical selection to see a customized selection of process data.

When moving closer to the plot a small function key is displayed. Find an overview of the features available below:

	Screenshot - Download plot as a png
	Use the cursor for Zoom function
	Use the cursor for Pan (move the diagram to any direction)
	Use the cursor to create a Box Selection (select an area in shape of a box)
	Use the cursor with a Lasso Selection (select an area in any shape that is pulled with the cursor)
	Zoom In by click

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	Zoom Out by click
	Autoscale
	Reset axes
	Toggle Spike Lines (shows orientation lines on the x and y axis) when hovering with the cursor over the plot. Find an example in Figure 16
	Show single data information on hover with a flag (e.g. Figure 16)
	Show multiple data information on hover with a flag
	Produced with Plotly (for information only)

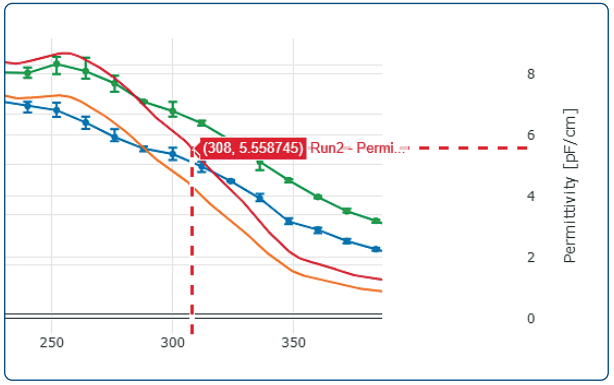


Figure 16: switched on toggle spikes and single datapoint

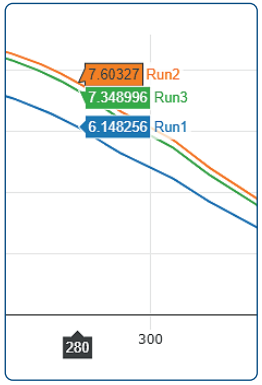


Figure 17: flag for multiple data point

5.5 Build a Model

After the data has been evaluated as suitable via the visualization, it can now be used for model building. If certain runs are classified as unsuitable, they can be eliminated from the *Current Data* set via the small X (navigate back to *Dataset* in the option list) and replaced by other datasets.

1) Click build model
2) Select the organism that was used in the cultivation. Algorithms for animal cell culture, yeast or bacterial fermentation are available
3) Click *Build* and validate *Model*
   a. Use advanced options to include or exclude the conductivity data for the model building
4) Enter a specific name for the calibration model (max 16 digits)

As soon as the model building is completed, an overview is displayed. All batch data and the settings are listed here. By clicking on *Show details*, more information about the model can be obtained. The same information is saved together with the overview in the validation report as a PDF and can subsequently be used for documentation in the GMP process (click *Create Validation Report*). To transfer the model to an Incyte Arc Sensor, export from AADM by clicking the button *Export Model*. This AADM-model is ready for import into ArcAir (see Figure 29).

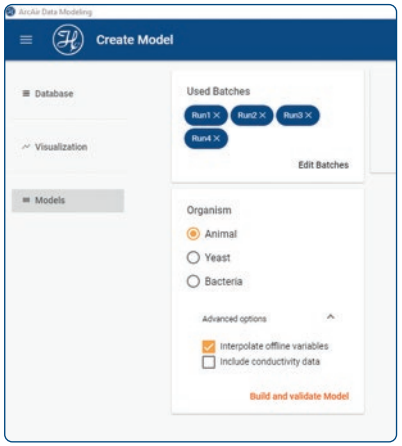


Figure 18: Advanced options when building an AADM Model

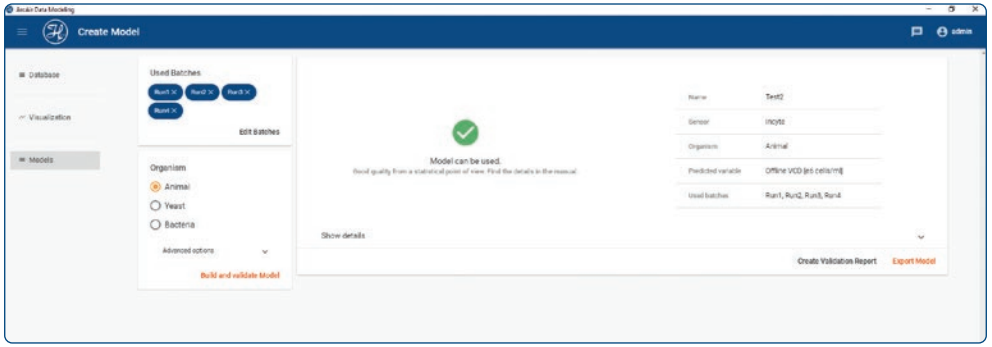


Figure 19: Overview after Model building is completed.

In the center of the overview window, a software-supported recommendation for evaluating the validation of the model is displayed (compare Figure 19).

Model Qualifier color	Describing information	Additional information
Green	Good quality from a statistical point of view. Find the details in the manual.	Model parameter OK ($R^2 > 0.9$); stable model-coefficients
Orange	Model may still be possible to use, however cross validation with individual process requirements is highly recommended.	Model parameter OK ($0.8 > R^2 > 0.9$); instable model-coefficient. OR Moderate model parameter (bad R^2 and low number of batches)
Red	Using this model is not recommended. Data is not sufficient.	Model parameter bad ($R^2<0.8$); (bad R^2 and low number of batches)

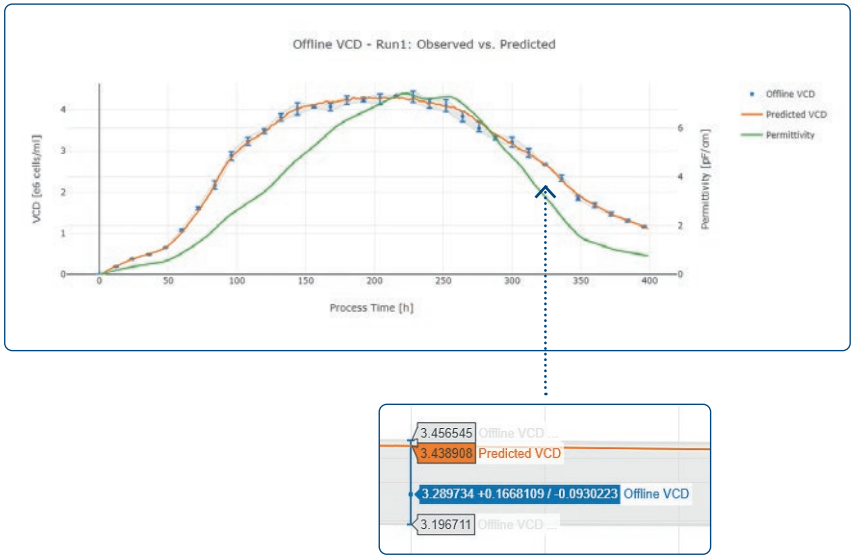
A detailed R^2 description can be found in Chapter 5.7.

5.6 Interpretation of the Residual Plot

The modeling of the AADM software is based on normally distributed data without any outlier data. To be able to assess this, the overview of the residual plot was introduced. Here the offline data points are used in relation to the correlated data. This plot is based on the following calculation (see equation and Figure 20):

This plot can be used to evaluate if batch data is suitable for the model, to eliminate outliers, or to improve the model in certain sections by taking more offline samples.

Find help to interpretate and to see example data by clicking in the question mark that shows up when “show details” is selected.



$$\frac{correlated\ VCD - mean\ offline\ VCD}{max.\ offline\ VCD} = \left(\frac{3.44 - 3.29}{5}\right) \cdot 100\% = 3\%$$

Example how residual plot is calculated

5.7 Interpretation of the Validation Report

The *Validation Report* holds the overview of the Batch data used to build the model together with the modeling settings. The main information for the Validation of the AADM-model can be found below this section (find example Figure 21).

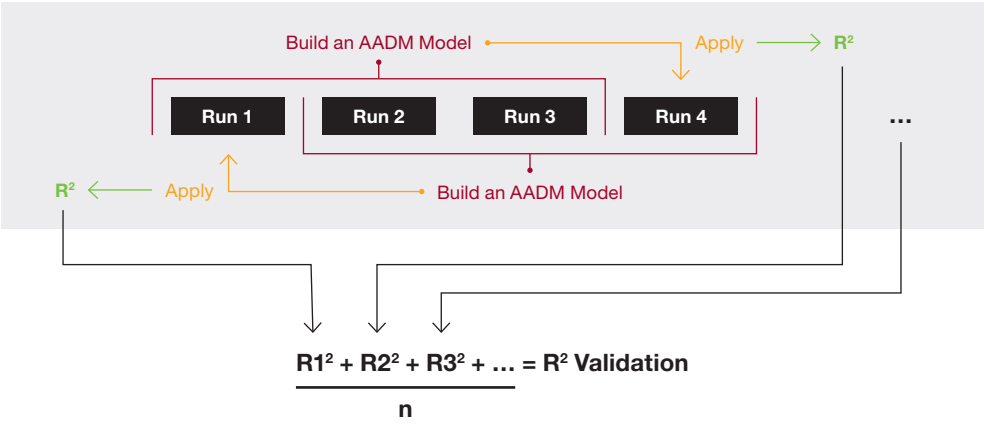
The *Checksum* is a model identifier. With the checksum a manipulated AADM model cannot be uploaded onto an Incyte Arc sensor.

The *Residual Plot* has been described in Chapter 5.6.

R^2 is a statistical parameter that in general represents how good a correlation is in comparison to the data it is based on. R^2 can be between 0 and 1, where 1 is a perfect fit of the data point with the correlation function and 0 is no correlation at all.

AADM represents the validity of the model with two different R^2 - R^2 training and R^2 validation.

R^2 training is calculated with the final formed model. It shows the sum of the difference between the calculated values of the AADM model and the measured values as an amount averaged over the number of measurement points. This value allows an interpretation of how well the model fits the input data sets.



To calculate the *R^2 validation*, one of the batches that model is build with is taken aside (e.g. separation of Run 1) – "leave one out cross validation" method. The remaining batches (e.g. model builder: Run 2, Run 3 and Run 4) build a model that is then used for correlation on the separated batch data (e.g. Run 1) and the R^2 is calculated. This routine is repeated with all batches (continued with Run 2 being separated, building a model with Run 1, Run 3 and Run 4 that is than applied to Run 2 and calculation of R^2). In the end the mean of all validation turns is summarized in the validation report.

All batches that were used to build the model are plotted in the validation report. This plot legend is shown below:

Line or symbol and color	Representative
	Offline sample with error bar coming from the triplet that has been derived from the triplets.
	Area that is connecting the edges of the error bars. To support validation procedure and visualize where the correlated signal is expected.
	Correlated Data. The AADM model is applied on the inline Incyte Arc data.
	Permittivity signal from the Incyte Arc Sensor.

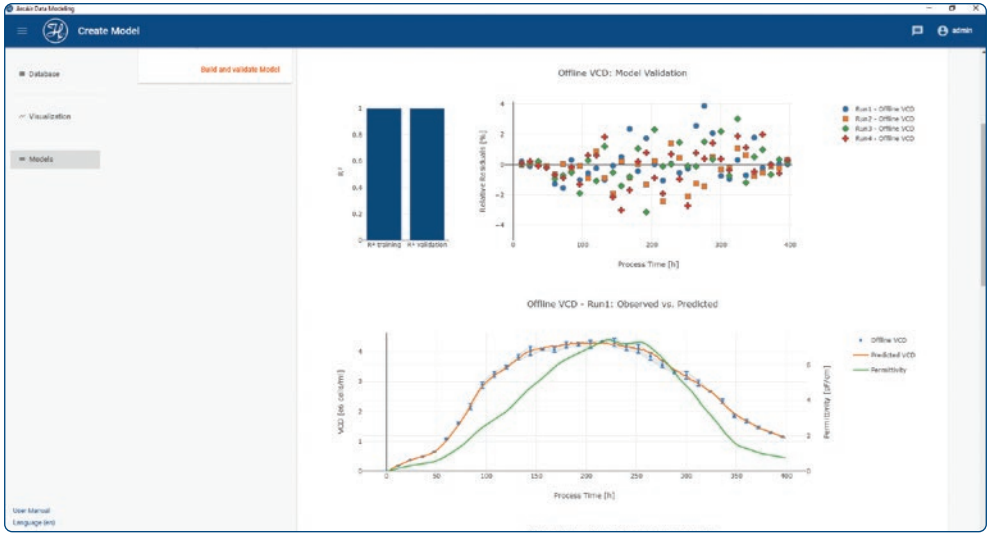


Figure 20: Example of all the details in the model validation

5.8 Extend existing AADM models or apply to new batch data

AADM models can take advantage of historical data to grow and improve over time. The *Model* function can be used to validate how new batch data matches the historical data.

1) Import the new batch data (inline and offline data) into AADM (e.g. Run 4 in Figure 22)

2) Load the batch into the *Current dataset*

3) Navigate to *Models* and select the existing AADM model that should be extended (e.g. CHO K1 in Figure 22)
4) Click *Apply on current Batches* and study the information displayed below. They are similar to the validation report so feel free to go back in this manual to find further information about the interpretation of this information
5) When the performance of the model together with the new batch has been validation as good, load historical and new batch data into current dataset and build a new model

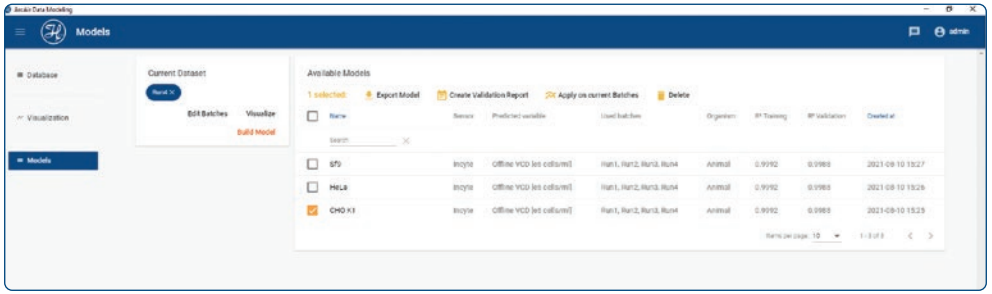


Figure 21: Example: Apply on Current Batches

5.9 Create a Validation Report

After building an AADM model it is possible to create a validation report. There are two ways to export the model:

Direct Export of Validation Report from building a model:

1) Build the model as described in Chapter 5.5
2) Click *Create Validation Report* in the overview section
3) Save the PDF in the desired folder

Export Validation Report of existing/old AADM models:

1) Navigate to *Models*
2) Select the AADM model of choice
3) Click *Create Validation Report* in the menu above
4) Save the PDF in the desired folder

5.10 Delete a Model

1) Navigate to Models
2) Select the AADM model in Available Models
3) Click Delete in the menu above the AADM model overview
4) Confirm by clicking OK

5.11 Export a Model

In order to transfer an AADM model to the Incyte Arc Sensor it has to be exported. There are two ways to export:

Direct Export of AADM from building a model:

1) Build the model as described in Chapter 5.5
2) Click *Export Model* in the overview section
3) Save the AADM model as an .incal file

Export existing/old AADM model:

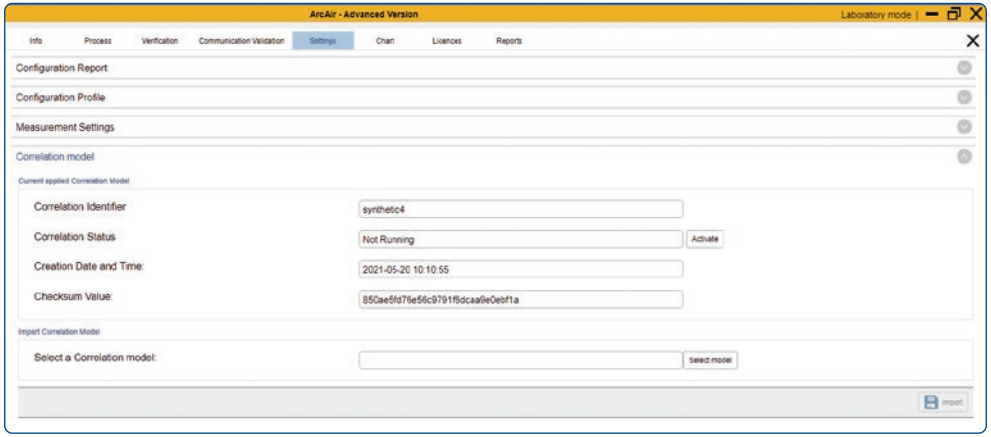
1) Navigate to *Models*
2) Select the AADM model of choice
3) Click *Export Model* in the menu above
4) Save the AADM model as an .incal file

5.12 Transfer the AADM model onto the Incyte Arc sensor with ArcAir

1) Connect the Incyte Arc to a computer
2) Open ArcAir and click on the Incyte Arc sensor
3) Navigate to *Settings* and open the drawer *Correlation model*
4) Scroll down and navigate to the folder system where the .incal of the AADM model is stored
5) Click Import

After the import of the AADM-model it is automatically activated. The status (active/inactive) can be observed and changed in the upper section of the *Correlation model* drawer by using the displayed button.

Be aware that once the AADM model is imported and active the unit of the cell density cannot be changed. To work with the cell factor and a different unit, deactivate the AADM Model, change the cell factor, and set the desired unit.



6 Maintenance

6.1 Model Maintenance

Multivariate data analysis thrives on the foundation of historical data. The historical data pool is constantly growing through the implementation of new processes. In order to be able to represent the entire process history in the AADM model, it is recommended to update the model regularly with current process data. Follow the instructions in Chapter 5.8.

6.2 Software Update

1) Please check our website for new updates. If an update is available: download and save the file.
2) Please perform an installation as described above.

7 Troubleshooting

Scenario	Cause	Additional information
Incyte and offline Data Sets are not combined under the same batch name	Mismatching Batch Name	Check the wording and spelling of the “Batch name” in the Incyte and offline files (see Figure 23)
Failed Import	Modified CSV file	Saved files from ArcAir should be imported directly into AADM, without opening it in Excel. If changes need to be done, use a text editor to ensure the right format.

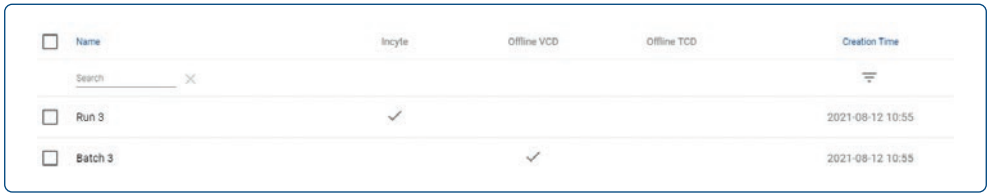


Figure 22: Inconsistent Naming of online and offline data

8 Related Documents

- Incyte Arc Operating Instructions (Ref 10072078)
- ArcAir System Manual (Ref 100071115)

9 Glossary

AADM	ArcAir Data Modeling – Hamilton Software Tool for Incyte Arc to use Sensor information to derive an improved offline correlation.
AADM-model	Output of the AADM Software that can be uploaded on the Incyte Arc Expert Sensor as a soft sensor.
Inline	Inline measurements include sensors that are in direct contact with the environment in which they are to measure (invasive). These measurements offer the possibility to provide data in real time.
Offline	Samples taken from the bioreactor and measured separately – with time offset and spatial distance.
Permittivity	Measurement output of the Incyte. Is representing the viable cell volume.
VCD	Viable cell density – representing the living cells measured in a solution, often measured using automated imaging measurement systems. Can be expressed as a cell count in cells/mL.
VCV	Viable cell Volume – representing the living cells in a solution, represented by the permittivity-signal.

10 Ordering Information

10.1 Incyte Arc Sensors



Ref	Product Name	Ref	Product Name
243950-0211	Incyte Arc 120 – Expert	243950-0213	Incyte Arc 320 – Expert
243950-0212	Incyte Arc 220 – Expert	243950-0214	Incyte Arc 420 – Expert

Description: A Sensor with the full capability of running Dual Frequency Measurement and Scan (including measurement export), capable of Cole-Cole Fitting and off-line/on-line correlation (ArcAir Data Modeling). Full GMP compliance is provided with ArcAir Advanced.

10.2 Arc Parts and Accessories



Ref	Product Name
243490-01	Arc USB Power cable USB / VP 8 for direct connection to the sensor

Application: The Arc USB Power Cable provides power supply via USB port for Arc sensors and digital communication to Hamilton's PC software for monitoring, configuration, calibration, and firmware updates. Supplied with optional power supply, in case the computer does not provide enough energy to power the sensor. USB 2.0 provides enough power.

10.3 ArcAir Software

ArcAir Application

Download on the App Store

GET IT ON Google Play

NOTE: Can be upgraded via In-App purchase in the ArcAir application.

NOTE: In territories, such as China, the Google Play Store is not an option. ArcAir for Android is nonetheless available after downloading on those devices the Amazon Appstore as described at www.amazon.cn/androidapp. ArcAir on Amazon Appstore is available in three separated versions: light, basic and advanced.

11 Arc Service

Hamilton service engineers are available in Europe and China to provide customers with on-site services. Hamilton offers a wide range of services from technical support to initial operation, qualification, and maintenance of the sensors. Various tailored services are offered especially for the BioPharma, ChemPharma, and brewery industries. Experienced service engineers ensure an optimal and professional service. To find your local service support please visit: www.hamiltoncompany.com/process-analytics/support

Overview of service offers

- Online service
- Technical support
- Initial Operation/Calibration
- Qualification (IQ/OQ)
- Service packages
- Maintenance
- Training

NOTES

NOTES

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