ReportLoq DAHS

User Manual

Revision 2.8 (13th October 2025)

Environmental Reporting

1 Table of Contents

2 Preface

ReportLoq is a Data Acquisition and Handling System (DAHS), which is used by waste incineration plants for reporting airborne emissions and complies with, i.a., EN 17255-1:2019, EN 17255-2:2020 and EN 14181:2009.

This user manual describes ReportLoq and can either be read from beginning to end or be used as a reference work. It describes how ReportLoq communicates with the cloud, how its graphic interface is used, and how it may be used as a tool to avoid exceeding emissions limits.

ReportLoq is available in the following four versions with the following features

	ReportLoq Soft	**ReportLoq⁺**	**ReportLoq⁺ Cloud**	**ReportLoq⁺ Pure Cloud**
Local server	Yes	Yes	Yes	No
Access via www.reportloq.com	No	No	Yes	Yes
Installed by Olicem (⁺)	No	Yes	Yes	Yes

The manual provides a general description, which describes the versions supplied with a local server.

ReportLoq is a server-based product. Its graphic interface is accessed via a browser from another device. It is not necessary for users of the system to log on to the server directly, as it is recommended that this be reserved for system administrators.

3 Hardware

3.1 ReportLoq Soft

It is recommended to install ReportLoq on server-graded hardware with a minimum of:

- Operating system: Windows 10 / Windows Server 2019
- Memory: 16 GB
- Hard disk requirements: 20 GB free disk space + 5GB per line measured.
- CPU: 4 cores

3.1.1 I/O

The most common interface for I/O is in ReportLoq Soft OPC-UA. For more info, see the technical user manual, which can be found in the ReportLoq installation library.

3.2 ReportLoq⁺ and ReportLoq⁺ Cloud

The server is delivered, installed, and managed by Olicem. Installation may consist of the following hardware:

- **SSL module (Secomea SiteManager)**
  All types of license: Used for service technician access
  Only Cloud: Used for communication with Olicem's data centre

- **Data collector (I/O)**
  Communications with an analyser and data logging
- **Server**
  Calculation of environmental values for use in CCR (Central Control Room) and visual interface
- **IPC**
  Combined server + controller
- **Other**
  I/O modules, switches, cables, cabinet

3.2.1 Secomea SiteManager

This is a certified SSL module/firewall which gives service technicians access to hardware by being connected to the Internet on port 443 (SSL) and which can simultaneously act as a time server (NTP).

In ReportLoq+ Cloud, the module ensures that the reading can be sent to Olicem's data centre without third party involvement. Data are sent to the data centre, where they are securely stored.

The module contains two network connections, UPLINK and DEV. UPLINK is connected to the Internet and DEV is used for installations, while ReportLoq has its own subnet. The module creates an out-going connection the Olicem data centre and must be connected to the Internet via port 443. There is no need to open any in-going ports in your firewall. Only the out-going connection on port 443 is required.

Please note that SiteManager will open up for technician access on the network it is connected to. Therefore, you should always ensure that SiteManager is placed on a network where it only has access to the Internet and not able to access other equipment than that provided by Olicem.

3.2.2 Data collector

The data collector is connected to your analysing equipment either via a BUS connection, or else it is hard-wired, and saves real-time measurements from the analysing equipment. The unit logs a complete picture of all measurements every 10 seconds and saves them together with a status of the measurement, describing the circumstances under which it was recorded. In other words, the data collector will not just log, e.g. O2, but also whether the installation was online, under maintenance, had a fault, etc. All of this is saved to the data collector every 10 seconds and stored there for 30 days. If the Internet connection to the data centre should break down, this means that you will have 30 days to re-establish the connection without losing a single measurement.

3.2.3 Server

The server can be supplied as a rack-server or as a virtual server. Both solutions are designed for extra high uptime by addressing failures in the most common wear parts.

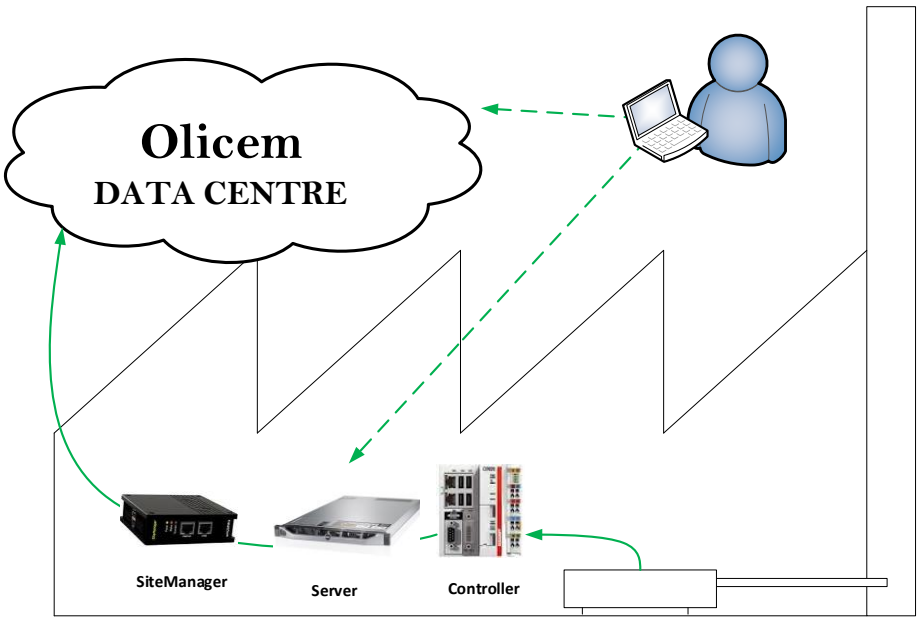
The rack-server has both redundant disks and power supply and can keep running even if one of those should fail. This solution is recommended if you have your own rack and depend on high uptime.

The virtual solution requires its own virtual environment that has a server where ReportLoq can be installed. One of the advantages of a virtual solution is the fail-over option in the event of errors and the backup of machines under operation.

The server retrieves the measurements from the data collector and stores logged data and calculations for at least 5-10 years. If the Internet connection were to break down for lengthy periods of time, data would not be lost for the period concerned. The server can be configured to make a daily backup of itself, which can be copied to its own FTP server. Backup of environmental measurements for Olicem's data centre are also saved in ReportLoq+ Cloud.

The server can be accessed via the browser and has the web interface for ReportLoq where the environmental calculations can be monitored.

The environmental calculations in the server can be transferred to the data collector and then on to the CCR plant for automatic regulation herein.



3.2.4 IPC

The IPC solution is an industrial solution, which combines the Server and data collector in one unit.
NB: IPC is not suitable for redundant data collection.

3.2.5 Redundancy

ReportLoq may be supplied with redundancy, if required. A redundancy solution ensures a particularly high degree of run-time, since hardware errors will not result in lost environment measurements. You can choose between various degrees of redundancy for the system.

3.2.5.1 Redundant data collectors

Logging of environmental measurements take place in the data collector and a breakdown will result in data loss. In cases where there is a requirement for additional safeguarding of environmental measurements, redundant data collectors may be the solution. You can choose two or more data collectors, which are able to log the same measurements independently of one another. In a situation with three kiln lines, for example, you could have two data collectors, each containing all three lines. These will therefore be redundant and if one data collector is turned off, the other will continue to log measurements on all three lines. All data collectors are connected to the same network but do not know that the other

exists. This means that when a data collector is unavailable, the other data collectors are not affected, resulting in the best possible safeguarding of your measurements.

In the case of redundant data collectors, you can alternate between turning one of the redundant data collectors off, as long as the period that they are switched on overlaps. When ReportLoq collects data from redundant data collectors, it will automatically detect holes in the data stream and look after data to patch up the holes with on the other controllers. In this way, the holes are "patched up" when ReportLoq retrieves data from the data collectors.

In short, redundant data collectors ensure that your data is logged on a constant basis.

3.2.5.2 Redundant analysers

Even if you have protected yourself with redundant data collectors, it is of little help if you only have one analyser, which fails. Should this analyser break down, you will have no reliable measurements. If you have gone all the way and invested in redundant analysers, these are obviously also supported by ReportLoq. Redundant analysers can be set up as prioritised meters or average meters.

3.2.5.2.1 Prioritised meters

If you have, e.g., two CO meters, both readings will be visible in ReportLoq, although it will only be using the primary reading for the environmental calculations. If the primary meter should be under maintenance or have a fault, ReportLoq automatically selects the other analyser so that your environmental calculations are not affected. You can also set the analyser priority, if you suspect that one may be faulty.

In order to ensure correct REAL time display in the CEMS picture, it is important that the confidence interval is applied to all prioritised components, as well as the calculated component. Conversely, a threshold value may only be applied to the calculated component, thereby ensuring that exceedances are not registered twice.

3.2.5.2.2 Average meters

If you for instance measure flow on more than meter, ReportLoq can give you the average of the measurements as an STA value. In the average value, meters with failure and maintenance are screened out so that it represents the average of the valid values.

In order to ensure correct REAL time display in the CEMS picture, it is important that the confidence interval is applied to all prioritised components, as well as the calculated component. Conversely, a threshold value may only be applied to the calculated component, thereby ensuring that exceedances are not registered twice.

3.2.5.3 ReportLoq+ Cloud

If you have chosen the cloud solution, you will always have access to the overview via www.reportloq.com, even if your server is off-line. Olicem's data centre is always connected to servers and data collectors and will, in case of breakdown of a server or controller, search after data on the other components. These

functionalities guarantee you that you always have an overview of your environmental measurements on www.reportloq.com, even if anything happens [1], and you lose your server.

3.3 Time synchronisation

Due to a requirement for correct time synchronization of environmental reporting equipment, the clock on the ReportLoq server and data collector must be set periodically.

The ReportLoq server synchronises time via NTP with an NTP server once an hour. In the event of time drift, the time is corrected by 2 seconds per hour. Data collectors set the time via NTP against the ReportLoq server and ensure that the data collector and server are always in sync.

[1] Please note that at least one data collector/IPC must be turned on and on-line in order to be able to log measurements.

4 ReportLoq DAHS

To access ReportLoq, you need to use the web browser. IE, Firefox, Safari and Chrome are all supported, but for the best experience, Chrome is recommended. Access typically only works internally on the network.

We do not recommend enabling public access to the local system. This functionality is accessible in Cloud versions via www.reportloq.com instead.

The set-up may vary from system to system, as ReportLoq is configured according to an environmental permit. This manual is intended for all users, but it will differ in some respects from the system that is supplied. If you have any questions that the manual does not answer, please contact Olicem at support@olicem.com and we will endeavour to help you as soon as possible.

4.1 CEMS

The CEMS[2] page shows logged real-time values on a continuous basis and provides a rapid overview of calculations made in ReportLoq. The page is accessible on both the local server and www.reportloq.com. An alarm list containing information that the operator must pay special attention to is displayed at the top of the page on the local server. For the same reason, the page is particular suitable for displaying in a control room.

Name	Raw value	QAL3 calibrated value	QAL2 calibrated value	Correction	Corrected value	Confidence interval	Quality assured value		Valid	10 min. avg.	30 min. avg.	1 day avg.	Set-point
Kiln	1	1	1		1		1	min.	✔	09:00s	09:00s	10:30m	
Filter	1	1	1		1		1	min.	✔	09:00s	09:00s	10:30m	
O2	5.21	5.21	5.21	°K_H2O	6.44		6.44	Vol%	✔	8.94	8.94	8.77	
H2O	19.10	19.10	19.10		19.10		19.10	Vol%	✔	20.06	20.06	20.00	
Temp	127.1	127.1	127.1		127.1		127.1	°C	✔	128.1	128.1	128.0	
Press	1,001.6	1,001.6	1,001.6		1,001.6		1,001.6	hPa	✔	1,007.4	1,007.4	1,007.0	
ACC	891.3	891.3	891.3		891.3		891.3	°C	✔	940.3	940.3	937.0	
CO	5.0	5.0	5.0	°K_H2O°K_O2	4.2		4.2	mg/Nm³	✔	5.3	5.3	5.2	
Dust	-3.7	-3.7	-3.7		-3.7		0.0	mg/Nm³	✔	0.6	0.6	0.5	
HCl	0.1	0.1	0.1	°K_H2O°K_O2	0.1		0.1	mg/Nm³	✔	1.3	1.3	1.2	
NOx	175.1	175.1	175.1	°K_H2O°K_O2	148.6	100	48.6	mg/Nm³	✔	149.6	149.6	142.2	300.0
SO2 (1) +	0.4	0.4	0.4	°K_H2O°K_O2	0.4	20	0.0	mg/Nm³	✔	0.0	0.0	0.0	88.9
TOC	1.0	1.0	1.0	°K_H2O°K_O2	0.8		0.8	mg/Nm³	✔	1.1	1.1	1.0	17.0
HF	1.0	1.0	1.0	°K_H2O°K_O2	0.8	0.4	0.4	mg/Nm³	✔	0.7	0.7	0.6	1.3
NH3	1.0	1.0	1.0	°K_H2O°K_O2	0.8		0.8	mg/Nm³	✔	1.1	1.1	1.0	
Flow	142,773	142,773	142,773		142,773		142,773	Nm³/h	✔	159,098	159,098	158,013	
CO2	2.0	2.0	2.0	°K_H2O°K_O2	1.7		1.7	Vol%	✔	2.1	2.1	2.1	
NO	113.7	113.7	113.7	°K_H2O°K_O2	96.5		96.5	mg/Nm³	✔	160.8	160.8	156.1	
NO2	1.2	1.2	1.2	°K_H2O°K_O2	1.0		1.0	mg/Nm³	✔	3.6	3.6	3.4	
Hg	456.3	456.3	456.3		456.3		456.3	mg/Nm³	✔	594.6	594.6	585.4	
Olie MW	823.3	823.3	823.3		823.3		823.3	MW	✔	1,843.3	1,843.3	6,000.6	
Biogas MW	300.0	300.0	300.0		300.0		300.0	MW	✔	0.0	0.0	0.0	

Correction factors:
K_P = 1013 / (P_act)
K_T = (273 + T_act) / 273)
K_H2O = 100 / (100 - H2O_act)
K_O2 = (21 - 02_ref) / (21-O2)

Constants:
= 1.01O2_ref = 1.47O2_max = 1.24 = 0.69

Information:
= 11.00Last updated = 23-04-2015 10:39:07
= 17.00Connection to CEMS database = Established

Settings | Status: Started

Black The value is irrelevant in terms of reporting
Green The value is within the threshold
Yellow The value is presumed to exceed a threshold or a set-point

Figure 1 - CEMS view gives you an overview of how your raw measurements end up as the quality assured values that are the basis for the environmental reporting.

[2] CEMS: Continuous emissions monitoring system

The ReportLoq system logs data every 10 seconds[3] and is updated continuously, allowing you to monitor the measurements on an ongoing basis throughout the day. The CEMS page is updated automatically, so you can constantly view the latest data and current averages.

NB: You can get a visual explanation on the way from raw to quality-assured value if you click on one of the quality-assured values.

4.1.1 Raw value

This value is usually the same as the reading on the analyser. Representing the raw value in ReportLoq ensures that you can track the signal from the analyser and confirm that it is correctly entered in ReportLoq. Deviations are however estimated values, such as NO_X, which are calculated from a formula. In such cases, the formula can be found on the *Company info*[4] page on www.reportloq.com after which you can make the same calculation. NO_x, for example, is often calculated on the basis of $1{,}53*NO_{\text{raw value}}+NO_{2\ \text{raw value}}$.

4.1.2 QAL3 calibrated value

Having performed QAL3 using the CUSUM method, A and B values are then calculated and used to correct the raw value accordingly. This means taking a raw signal, which surely has driven over time, and adjust it to the correct value. QAL3 is often carried out using zero and span gases with known concentrations. In ReportLoq, the corrected QAL3 value is included for you to see the effect of a QAL3 adjustment.

QAL3 adjustments need to be entered under menu item QAL[5]. The QAL adjustment result is not used until midnight, which is why you can correct/delete a recently created QAL adjustment until this time. After this, it becomes part of the environmental calculations and is locked.

Calculated components such as NO_x are calculated on the basis of $1{,}53*NO_{\text{QAL3 value}}+NO_{2\ \text{QAL3value}}$.

4.1.3 QAL2 calibrated value

Having performed QAL2, A and B values are then entered, correcting the QAL3 value accordingly. Having created a new QAL2, the correction, as with QAL3, does not come into force until midnight. This also resets the control chart (QAL3). QAL2 is carried out by an accredited survey institute and is entered into the menu QAL in collaboration with the survey institute.

Calculated components such as NO_x are not calculated separately.

4.1.4 Correction

All values included in environmental reports must, in accordance with EN14181 be corrected to reference condition 0 °C, 1013 hPa, 0 Vol. % H_2O and a plant-specific O_2 reference, typically 11, 6 or 3 Vol. %. (The reference condition is shown as O_2_ref). If the measurement has not already been corrected in respect of all support parameters in the measuring instrument, it must be performed mathematically.

[3] The logging interval can vary but it will always go into one minute and never be less than 10 seconds. For instance, 10/20/30/60 seconds.
[4] In ReportLoq+ Cloud at www.reportloq.com. In ReportLoq+: Locally
[5] In ReportLoq+ Cloud at www.reportloq.com. In ReportLoq+: Locally

O_2 used in the K_O_2 formula is limited to ensure that the correction cannot be higher than 2.5. The correction is likely to be interminable without a limitation, thereby destroying the dataset. The O_2 limitation is shown as O_2_max.

In order to achieve the desired reference condition, corrections must be made according to the AMS measurement principle. O_2 and H_2O correction should typically be applied. Correction factors can be seen at the bottom of the CEMS view.

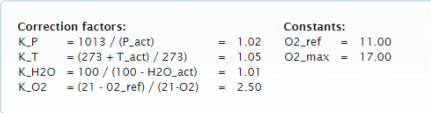


Figure 2 - CEMS provides a REAL time display of calculations for correction factors.

4.1.5 Corrected value

This column shows the final calculation of the corrected value. The corrected value is used for your green accounts and is the starting point for the quality assured value.

4.1.6 The quality assured value

This is the value used to calculate the interval values to which the environmental approval refers. You may, for example, have a threshold value A stating that you must not emit more CO than 100mg/Nm^3 per STA interval. Calculating the STA value is done on the basis of the quality assured value. This is the corrected value minus the confidence interval, which is the number you can subtract when using the QAL system. This means that the value can be zero, but it cannot be below zero.

4.1.7 30/60-minute interval values (STA[6])

According to EN14181, daily values must be calculated on the basis of STA (Short Term Average) values. Some STA values also have to satisfy threshold values. This makes the STA value a central element to environmental reporting. In the CEMS view you can see whether an STA value needs to comply with limit values by looking at the colour of the number.

- **Black** The value is irrelevant in terms of reporting
- **Green** The value is within the threshold
- **Yellow** The value is presumed to exceed a threshold or a set point

The STA value you can see in the CEMS view indicates the average of the quality-assured measurements right now.

At STA 30 minutes
If it is 11:20 the value of the CEMS view is the average from 11:00 to 11:20, with the last ten minutes still missing. Thus, the average will change after 10 minutes. If the figure is yellow, this means that you have 10 minutes to adjust it. At 11:30, the interval ends, and the interval is either saved or passed.

[6] STA = Short Term Average

Under the STA value, you can see the threshold value[7]. This is the value that you must be under, when the interval ends. If you have chosen to comment on B exceedance, the number will turn yellow when an exceedance of the B value is imminent. Being able to see the figure does not signify that you have chosen to comment on these. When in doubt, you can find this information under Company Information at www.reportloq.com.

NOTE!

If an STA value has a threshold value A, but is shown in black, it signifies that the interval is irrelevant in reporting terms. Consideration of when the value will be black depends on whether the reporting type is EN17255-1 or classic. The entire interval value will be marked 'EN' on the report and is therefore not assessed in relation to exceedances. These EN intervals are also not recognised when day values are assessed for exceedances.

EN 17255-1
This happens if more than 1/3 of the interval is measured under conditions other than when the kiln is activated, such as stopped or starting/stopping.

Classic
This happens if at least one value in the interval is measured under conditions other than with the kiln activated, such as stopped or starting/stopping.

Using the mouse to click on an STA value will open the graph as shown in Figure 3. This shows the measured 10 second values as well as the trending of the calculated STA value. As seen in the figure, the calculation exceeds the last measurement and goes to the end of the interval. This is a projected value, an estimate of where you will likely end up at the end of the interval. This is based on the interval up to that point and the measurements of the preceding 5 minutes. In this case, the projection is an end figure of 125, below the A threshold of 400. Therefore, the figure is green.

It is possible to receive an alarm in ReportLoq if the estimate exceeds the limit value[8]. The alarm will not be received until 33.3% after the commencement of the interval, or 10 minutes into an STA of 30 minutes and 20 minutes into an STA of 60 minutes.

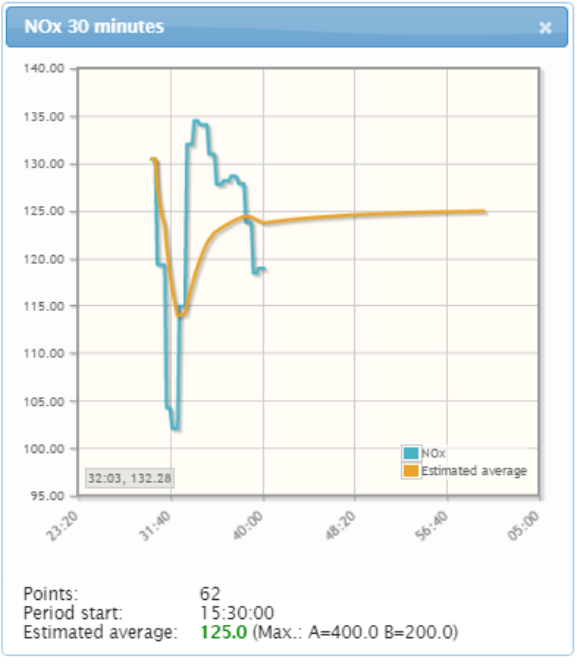


Figure 3 - STA estimate for NO_x

[7] If you don't have limit values under your coloured numbers, this can be set by pressing the button "Settings" at the bottom of the screen image on the local server.
[8]Contact Olicem, if this is desired.

4.1.7.1 ACC

Please note that the projection of the ACC temperature is not assessed on the basis of a STA interval even though it appears so in the CEMS view. ACC to be kept above, e.g., 850°C, is a rolling average that will always hindcast 10 minutes counted from the commencement of the current minute. These rules are thus not the same as for the other STA intervals, partly by being an underrun and partly by being a rolling average. The lack of colouring of the ACC temperature does not, therefore, mean that the value is irrelevant. The ACC threshold value must be adhered to in order to avoid underruns. If ACC is underrun for 10 minutes, the system will generate an underrun that appears in the alarm log.

4.1.8 Daily average (LTA[9]) & Set-point

The daily averages are calculated on the basis of the STA values. This does not, however, include STA values where the kiln has been out of operation for measurements to be environmentally reported[10].

The LTA values that can be seen in the CEMS view are the actual averages of the STA values and change throughout the day. Like the STA values, these use colour coding to indicate the reporting relevance of the values. The green colour indicates that the value complies with the reporting criteria. The yellow colour indicates that the LTA value is at risk of exceeding the threshold value, and if the colour is black it will be either because there is no threshold value or because the number of valid STA values is too low to generate an LTA value. When this happens, it depends on your environment directive[11].

Example: When a kiln is stopped:
If, for example, 6 hours of operation is required to generate an LTA value and the kiln is shut down at 02:00, the day will still be coloured green/yellow until 20:30, at which point the system will conclude that all intervals from 02:00 to 20:30 were rejected because the kiln was stopped. At this point in time, there are 3.5 hours' worth of potentially valid STA values + 2 at the beginning of the 24-hour period, giving a total of 5.5 hours of potentially valid STA values. The kiln will not be able to achieve 6 hours' operation time and the value is coloured black.

In order to comply with the daily value, the average of the 24-hour period is projected to the end of the day. This means that you will also have an estimate for the end of the day at this stage, in order to help you avoid exceedances. This estimated average is based on "not rejected" STA values and a projection of the last 3 hours' operation. Figure 3 Shows the calculated STA values and the estimated average.

In this way, you will have an idea of where the average will end up by the end of the day.

[9] LTA = Long Term Average
[10] If STA values are scrapped where the kiln has not been operational, this will be indicated under company information for the individual component.
[11] See "Active minutes per day" under "Companyinfo"

The set-point is an additional help, indicating the placement of the quality assured value to avoid exceeding the threshold value. The set-point moves up and down with the development in the daily value. If you are low, the set-point will indicate that a higher emission will not cause problems for reporting. The set-point, however, will never be higher than the A threshold value for the STA value. This means that you can follow the recommendation, safe in the knowledge that you will not risk exceedances. If there is a warning on the daily value, you will see the set-point moving down. In this case, this marks the limit for how high your quality assured value should be.

If your STA value exceeds the set-point, the STA value turns yellow. If the STA value does not end up above the set-point, the remaining values will have to be lower. This can be configured as an alarm in ReportLoq.

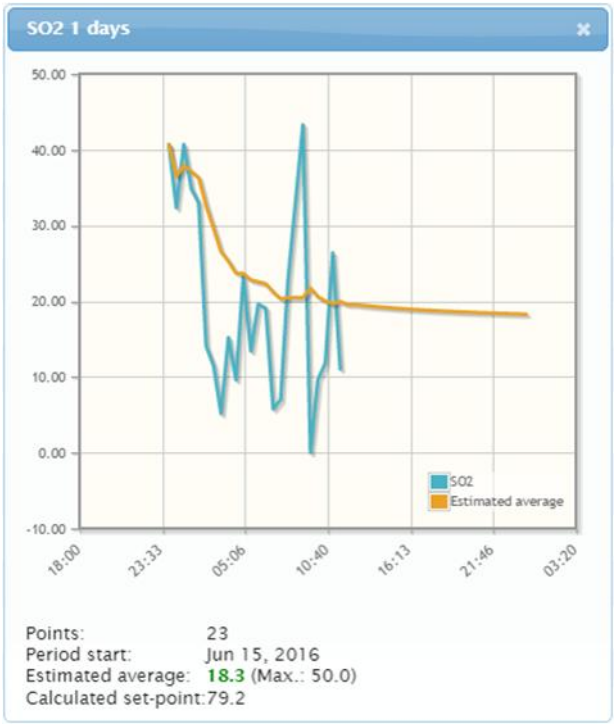


Figure 4 - LTA estimate for SO2

4.1.9 Weighted limit values

When firing from multiple kilns in the same stack, weighted limit values are often used. If this is the case for you, the limit values for both STA and LTA values may change continuously. The limit value depends on what is being combusted and typically the effect of the production.

Determining a threshold value is always done on the basis of what is produced and a projection of the value to the end of the interval, presuming that the production continues unchanged. If the kiln is offline, therefore, the presumption will be that it will remain offline and if it is operational, the presumption is that it will remain operational for the remainder of the day. In this case, the current production is used to estimate the remaining day's production. The result of these expected productions is used for producing the limit value seen in the CEMS view.

Projection of two production analysers and, e.g., SO_2 may thus tell us something about how much SO_2 can be expected to be emitted and what the threshold value is expected to be. The two results are used in ReportLoq to generate alarms as described for LTA and STA.

4.1.10 Plant state

At the bottom of Figure 1 is the field "Status", which may be used to indicate kiln start-up/stop. This field can be configured in accordance with your requirements, and a click with the mouse can show

1. Kiln started
2. Kiln stopped
3. Kiln starting
4. Kiln stopping
5. SCADA

The points 1-4 are interconnected and may only be added/removed as a total. So, it is possible to be shown all points on the list, or points 1-4 or only point 5[12].

SCADA operation means that the site-calculator receives the operations signal from the SCADA system and that the calculations are automatically based on the kiln status reported by the SCADA system.

When the operation signal is changed, a request for change of operational status is sent to the controller, which will only be able to determine if the request has been successful when logging the next set of measurements. This means that the request can be "hanging" for a few seconds before it succeeds!

[12] Contact Olicem if you wish to re-configure the Status button.

4.1.11 Settings

Under settings, you have the possibility of influencing the conditions that the readings are made under. If you place a signal in maintenance or error, the value is not changed, only the status that follows the value. The choice can subsequently be seen in the CEMS view and will impact the environmental calculations. Often, both maintenance and error are automatically controlled by the analyser, and you will not be required to do anything. The manual setting option is there to give you the ability to do something if the analyser should turn out to have a fault that it does not report.

By using redundant meters (such as SO_2 on Figure 5), you can choose to downgrade a meter for a period of time. This could be if you believe it is drifting and in need of a service and you prefer to use the secondary meter.

You also have the possibility of changing what the CEMS view shows and how it is shown.

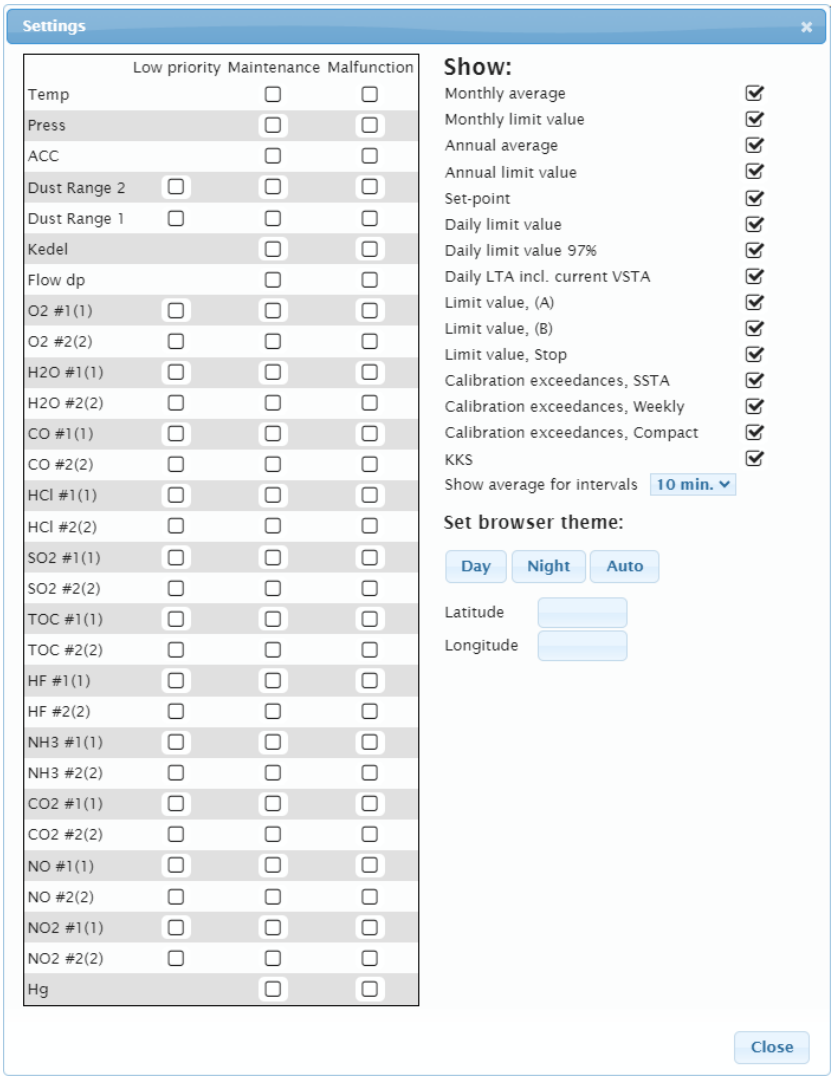


Figure 5 – Settings
Comment: The fields for "Low priority", "Calibration" and "Error" can be switched off, if the functionality isn't desired for the individual plant.

- You can toggle the display of the set-point on and off (which removes the set-point column)
- You can choose to have limit values displayed below the STA and LTA values
- You can choose to display 6 or 10 minute averages for the intervals
- You can select and deselect thresholds on a monthly and yearly basis
- You can view IDs (also called KKS numbers) if these are set up for your installation
- If you have optional visualisation of calibration intervals, these can also be selected on and off

Note that the settings affect all users. For example, if you choose to show 10-minute intervals, all users will get the same setup.

The graphic layout can be switched between day and night. If the theme is changed to 'Night', the colours will be dark. The night theme can be an advantage if ReportLoq is used in dark environments. This setting only affects the one computer where the setting is made. If you select 'Auto' with latitude and longitude,

ReportLoq will set the theme according to sunrise and sunset. Latitude and longitude are entered in the same format as they are entered in Google Maps by right-clicking on the map.

4.2 Events, alarms, alerts and exceedances

When events, alarms, warnings and exceedances appear in ReportLoq, they will be shown in a list.

A list of the CEMS view will be shown in the local view. The table may be red or black, depending on what it shows. If the alarm list holds an alarm or overrun that has not been acknowledged, the list will be red. In this case, an audible alarm is played in the browser, if your computer is linked to speakers. To acknowledge one or more alarms, select them in the table and acknowledge them with a comment. Events are black, do not need to be acknowledged and will not be auditory.

4.2.1.1 ReportLoq+ Cloud

Comments are uploaded with all measurements to www.reportloq.com, where they will be entered in the historic alarm list and become part of the exceedance reports.

4.2.2 Events and alarms

These types happen in the analyser and follow one or more components. An event does not need to be acknowledged and is merely information. This could be the information that a component has entered maintenance state. When maintenance is complete, the event disappears from the alarm list. Events are not audible and are shown so that you may see, e.g., when maintenance commenced. In case of maintenance, you can also check the component in the CEMS view that the signal in the "Valid" column shows a warning triangle. If you hover the mouse cursor over this, you will be told why. See Figure 6.

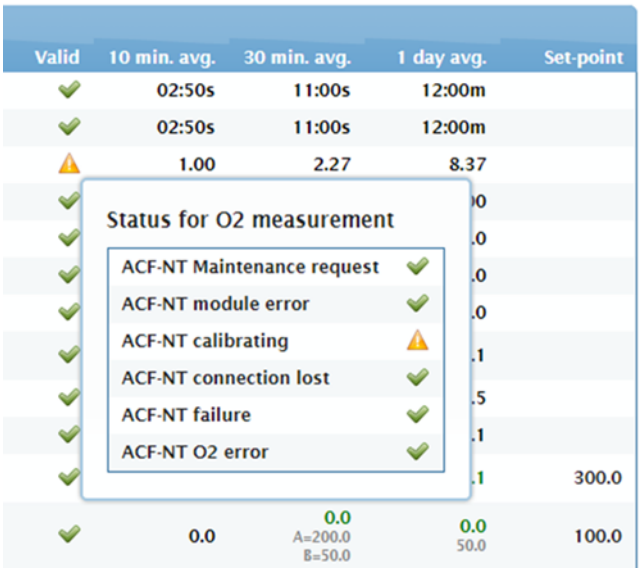


Figure 6 – When a component enters maintenance state, the yellow warning triangle is shown, and status is explained if you move the mouse across the symbol.

Alarms are created if something, for instance, is broken, e.g. a broken cable or lost signals from an analyser. This makes the measurement invalid and you may have to react quickly. Figure 7 shows an alarm set using the Settings menu. The O_2 meter is in the wrong position and the outcome can be seen in the component, which fails. This will appear in the alarm list just above the CEMS view in the local view. We see that the alarm started at 12:54:33 and is on-going. On-going alarms can be acknowledged, but not removed from the alarm list. If the alarm is acknowledged, the audible tone goes off, a possible indicator that the matter is being worked on.

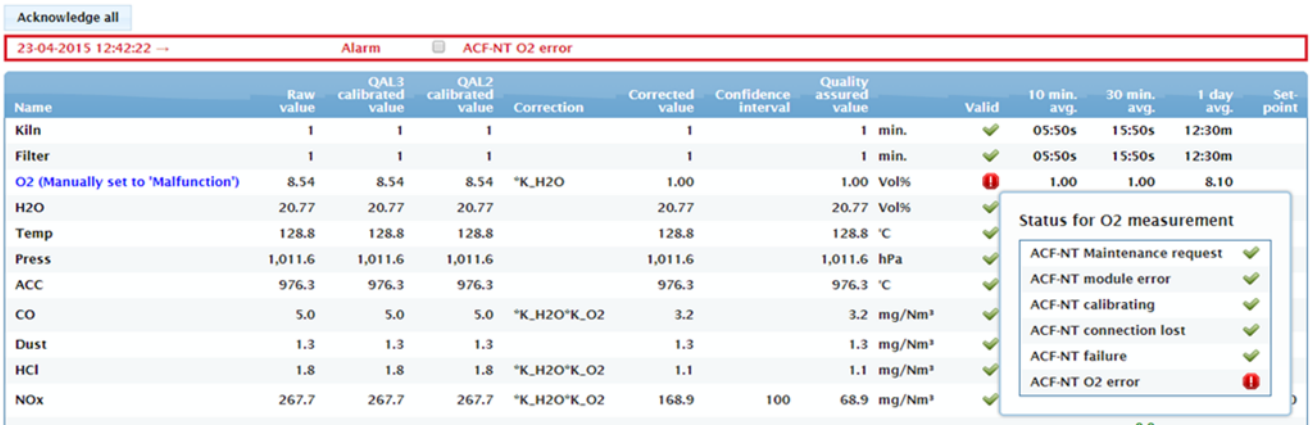


Figure 7 – O_2 reading is wrong.

4.2.3 Exceedances

On the local view, exceedances will appear in the alarm list, where they can be acknowledged and commented on. When acknowledged, the exceedance is removed from the list and can be found under the "Exceedances" menu.

Note: It is possible to suppress exceedance types if they are deemed irrelevant. Please contact Olicem at support@olicem.com if this is desired.

4.2.3.1 ReportLoq+ Cloud

Exceedances will also be auditory in the local view and must be acknowledged The comments in this context will be transferred to www.reportloq.com, where they will be part of the environmental statements.

4.2.4 Warnings

In the local view, alerts must be acknowledged, auditory and may be displayed in the alarm list if desired. It may be

- a presumed exceedance of an STA or LTA value
- a presumed STA value higher than the recommended set-point.

These two types may be selected/de-selected independently. The setting must be changed in the administration section of ReportLoq.

Please note that LTA value alerts are only shown after 8:00 and after a minimum of 5 valid STA values[13], since several interval values are required to be able to predict the daily value.

4.2.5 Automatic signing of alarms and exceedances

You can choose to receive all alarms from an instrument for a period of time in the local view, e.g. if you know that the instrument is being serviced and will therefore generate several alarms during the specific period. When the period is over, the automatic receipt functions will switch off by itself. Press "+" in "Guidance" for more info.

[13] Values where the kiln hasn't been still or been moving up and down.

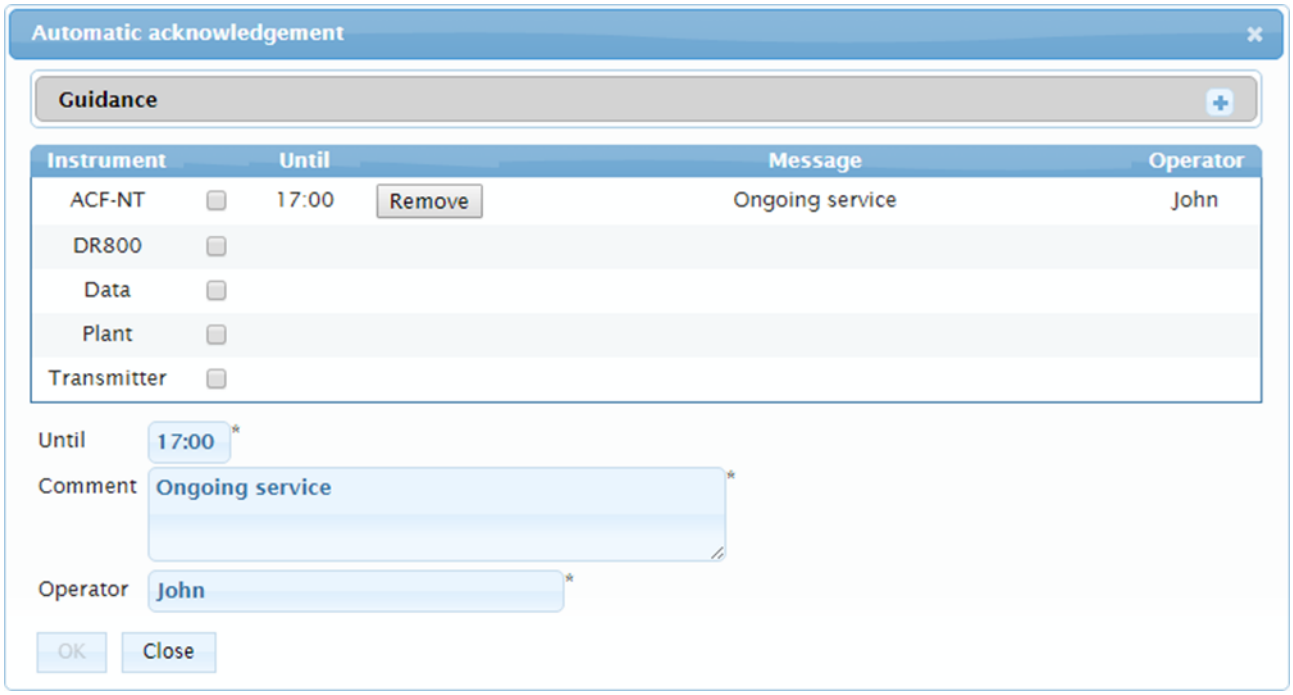


Figure 8 – Automatic signing

4.3 Signals to the control system

It is possible to enter values in the control system from ReportLoq. These can be copied via the data collector to the control system if desired. Available options are:

- K_T, K_P, K_H20, and K_O2 (Constants for normalising)
- "Alive" signal. To be set where the report values are older than 5 minutes.
- Critical system error Set if the reporting system experiences error.
- All estimated values in the CEMS view
- Projected daily values and set-points
- Estimated values
- Start/stop signals (in manual control)
- Component validation status
- 4-hour exceedances not acknowledged
- Momentary exceedances not acknowledged
- Total number of exceedances not acknowledged
- Number of alarms not acknowledged
- Number of alerts not acknowledged
- Number of active alarms and wire breaks
- Number of active warnings
- Total number of alarms, exceedances, and alerts not acknowledged
- Number of presumed LTA exceedances
- Number of presumed STA exceedances

The many different options provide ample opportunity for close integration of ReportLoq in the control system. As a starting point, all projected values are led back to the control system every 10 seconds, but it should be noted that the values are not considered “too old” until after 5 minutes. This is done to avoid unnecessary alarms at high CPU load on the system for shorter periods and when the system is being serviced.

NB: ReportLoq can be made unmanned in cases where the control room does not have access to ReportLoq. This means all notifications are auto-notified and the control room can be limited to monitor errors on the equipment.

4.4 Cockpit

Availability: ReportLoq⁺: Locally ReportLoq⁺ Cloud: www.reportloq.com

Shows an overview of the past week’s events and an overview of active alarms

NB: The page is updated every minute and can be used for monitoring

4.5 Reports

Availability: ReportLoq⁺: Locally ReportLoq⁺ Cloud: www.reportloq.com

Under the menu item reports there is a set of reports for each line and directive that each relate to the line and directive. Each report set is limited based on relevance at the time of delivery. The reports that appear are therefore the reports relevant for each directive.

Possible reports for day, month, and year include:

- Interval
- Interval, Production
- Interval, Count
- Green values
- Weighted limit values
- Mass emissions for Dust, CO, NOx, SO2, CO2…
- Cut-off for CO, Hg…
- Exceedance, B column (+Rolling)
- Exceedance, A column (+Rolling)
- Exceedance, comments
- Exceedances
- Operation time, Start/Stop (month + year)

Possible day reports include:

- QAL values
- Immediate reporting
- CO 10-minute intervals

Possible monthly reports include:

- Interval, Graphical

Possible annual reports include:

- QAL2 Valid calibration interval
- Exceeding year-to-date (A+B column)

4.5.1.1 ReportLoq+ Cloud

It is possible to make special reports in case of needs not already met by standard reports. Special reports can for instance include graphs, special calculations and custom layouts with a logo or similar. The special reports are based on Microsoft Excel and can be downloaded as Excel spreadsheets or PDF files.

4.5.2 Report: Interval

The report can be used to validate aggregated VSTA and VLTA values in relation to their limit values, so the confidence value is deducted.

The report always includes kiln signal, filter, flow, and support parameters. All components with limit values are also included. The value appears from the validation text marking kiln stop, exceedances, replacement values and rejected intervals.

NB:

- Components that are not part of the interval report can be found in the "Interval, Production" report.
- Exceeded intervals are shown in the exceeding reports.
- The reports are not suitable for reporting taxes because the confidence interval has been deducted and the lack of a replacement of the VSTA values on meters with downtime.

4.5.3 Report: Interval, Production

The report can be used to get an overview of SSTA and SLTA values for components without limit values.

The report always includes kiln signals for all components other than those specified in the "Interval" report. The report is the counterpart to the Interval report and as such makes up "the rest of" the components. The value can be seen with a validation text marking rejected intervals.

NB:

- The production report is not an emissions report and is often used to get an overview of emissions without limit values or production of MW.

4.5.4 Report: Interval, Count

The report calculates the number of VSTA values and also shows an overview of the status of the different VSTA values. Including, e.g. the number of intervals with exceedances or stoppage.

The report calculates the values for per period and per component. It is therefore possible to see which components tend to have a certain status, as well as the periods in which the status tends to occur.

The following are included in the report as standard:

- Components with limit values as well as peripheral parameters, operation and filter

The report supports but does not include the following as standard:

- Display of other components

4.5.5 Report: Green values

The report can be used as input for tax reporting and contains SSTA and SLTA without subtraction of the confidence interval and with replacement of invalid values with the highest valid SSTA value one week back acc. to BEK. no. 723 of 06/24/2011 §3.

The report contains the same components as the "Interval" report.

NB:

- If you need to report taxes, you can use the tax reports since they are based on green values and include automatic conversion to kilos.
- The report cannot be weighted against the limit values since the confidence interval has not been subtracted.

4.5.6 Report: Weighted limit values

Weighted limit values are used when the limit values are the result of a weighting of at least two factors. In reality, it is often the weighting of the two MW meters which feature as AMS components.

The report shows the weighted limit values which are estimated from the logged data.

The limit value is estimated based on:

$GV_{RESULTING} = (GV_{meter1} \times MW_{meter1} + GV_{meter2} \times MW_{meter2}) : (MW_{meter1} + MW_{meter2})$

The exceeded limit value is used automatically for validation and, in case of exceedances, will appear in the exceedance reports, where the estimated limit value will also appear.

The report includes all components with weighted limit values as well as the kiln signal and components used for weighting. In addition, the report has been validated so that it is easy to see which intervals have been exceeded, are not valid or irrelevant for environmental reporting.

NB:

- The report is used for limit values and can be compared to the "Interval" report. Therefore, its values have the confidence interval subtracted.

4.5.7 Report: Tax

The report can be used when paying taxes and contains an estimate of emitted kilogram. The tax report always includes a taxed component (such as NO_x) and as such is “double” in case of tax payments for several components.

In addition to the above, the report includes:

- Kiln hours as fees are only paid during operation of the kiln

- Flow in order to estimate kilogram
- The green value handled according to BEK. no. 723 of 06/24/2011 $3.
- Estimated kilogram

NB:

- Kilos at Vol% is estimated based on molar mass (http://www.kayelaby.npl.co.uk/chemistry/3_1/3_1_2.html)

4.5.8 Report: Cut off

The report is used as documentation for compliance with EN17255-1 Annex C by stating:

- Number of valid CO measurements during operation
- Number of cut-off CO measurements
- Percentage rate for cut-off measurements for VSTA/LTA
- Cut-off value/limit for day report

This makes it possible to document the number of cut-off FLD values for a given interval.

NB:

- The report includes an average percentage rate for the entire interval, which can be compared with the maximum 2% allowed cut-offs on a monthly basis.
- An exceedance of 2% on a monthly basis should result in the cut-off limit being raised and data being recalculated. Contact Olicem for assistance.

4.5.9 Report: Exceedance, column B

The B-column report must document that 97% of interval values are below the stated limit value for the B-column on a yearly basis. The report is also designed to provide an insight into how the calculation of the annual level has been made for each measured component and provides the possibility of zooming in on months/days with many exceedances.

The report counts:

- Number of valid intervals measured during operation
- The number of these intervals exceeding the emission limit values
- The validity of the LTA calculated as a percentage

The day report is special as it doesn't include calculations of percentages and mostly serves to explain when the exceedances happened on a certain date.

Monthly and annual reports both state percentages which makes exceedances in the B-column "year to date." If the "May" report is downloaded in August, "year to date" will be estimated from 1 January to the end of May. The estimate provides an overview over how close each component is to undershooting the 97% allowed intervals.

"Estimated Anno" is an estimate which projects the remaining number of intervals on a yearly basis to provide an indication of whether it is possible to comply with the 97% by the end of the year. The estimate includes the number of intervals over the rest of the year, working on the assumption that the plant is in constant operation.

4.5.9.1 ReportLoq+ Cloud

Please note that it is possible to include planned outage time in the estimate by using the menu "Planned downtime." The estimate will then have the planned downtime subtracted, and “estimated Anno” will reflect the new situation.

4.5.10 Report: Exceedance, column B Rolling

The report is very similar to Exceedance B-column, but without a calculation on an annual basis, since the rolling report instead rolls a year back from the start date of the report.

A day report from 6/20-2018 will therefore roll over from 6/21-2017 to 6/20-2018,
A monthly report from 6/1-2018 will therefore roll over from 7/1-2017 to 6/30-2018,
An annual report from 1/1-2018 will therefore roll over from 1/1-2018 to 12/31-2018,

The report calculates the percentage rate for the B-column in the past and will not examine the remaining year (as in the B-column report), but instead in the past year.

4.5.11 Report: Exceedance, column A

The A-column report is a detailed statement of many types of exceedances and shortfalls. The report can be downloaded on a daily/monthly/yearly basis and its purpose is to show the authorities how many critical exceedances the plant has experienced during a specific period.

All components which have stated an A-limit value are included in the report.

The report provides an overview of the following:

- Count of the number of exceedances for a given LTA period
- Number of rejected days on a yearly basis
- Number of exceedances of the ACC temperature
- Number of periods with 4 or more consecutive hours with A-column exceedances at STA level
- 60-hour budget with count of number of hours and summary of year to date
- Number of exceeded VSTA values leading to incineration stop
- Percentage rate of CO exceedances for year to date
- Projected percentage of CO exceedances based on the number of days in the year (doesn’t account for planned outage time).

4.5.12 Report: Exceedance, column A Rolling

The report is very similar to the report exceeding A-column, but without an estimation on an annual basis, as the rolling report instead rolls a year back from the start date of the report.

A day report from 6/20-2018 will therefore roll over from 6/21-2017 to 6/20-2018,
A monthly report from 6/1-2018 will therefore roll over from 7/1-2017 to 6/30-2018,
An annual report from 1/1-2018 will therefore roll over from 1/1-2018 to 12/31-2018,

The report is based on the past and will not examine the remaining year (as in the A-column report), but instead on the past year. This is the case both for rejected days, the estimate for CO exceedances and 60-hour budget.

4.5.13 Report: Exceedance, comments

The report is a detailed view of exceedances and comments grouped by date, cause and action.

The report includes the following as standard:

- Exceedances, A-column
- 4-hour exceedances (4 hours in a row with exceedances in the A-column)
- Daily and monthly exceedances
- Rejected days
- Interval stop value
- 10 min exceedances (ACC)

The following are supported by the report but not included as standard:

- Exceedances of 10-minute value (95%) at interval level
- 95% undershooting of rolling day according to 10-minute interval value according to BEK. 1271 of 11/21/2017 Annex 2, item 2.5
- Exceedances, B-column
- Exceedance of day middle-value (97%)
  In relation to BEK. 1271 of 11/21/2017 Annex 2 item 2.4
  The report will only include an indication of the exceedance for the individual days. The percentage estimate of the current calendar year will appear from the A-report
- Calibration interval: Exceedance of 1 week by 5%
- Calibration interval: Exceedances of 1 week by 40% (Critical/can cause QAL2)
- Calibration interval: Exceedances of 5 weeks by 5% (Critical/can cause QAL2)

The report prioritises comments and reasons entered by an operations manager with a higher position than the operator. In practice, this means that the operator's initial comments can be overruled by an operations manager, if desired.

NB:

- It is possible to exclude components from the report even though they have limit values.
- If changes to the standard setup are required, please contact Olicem.

4.5.13.1 ReportLoq⁺ Cloud

Comments are automatically transferred from the local ReportLoq server to www.reportloq.com, where they will be included in the report.

4.5.14 Report: Exceedances

The report indicates what percentage of the interval values are compliant with the emission limit values, plus the number of rejected days in the chosen calendar year and up to the end of the report.

It shows intervals measured during operation which did not have any errors and which, therefore, must be consistent with emission limit values.

The report includes as standard:

- Exceedances, A-column
- Daily and monthly exceedances
- Rejected days
- Interval stop value

The standard report, if used in the current setup, will include the following:

- 10 min exceedances (ACC)
- Exceedances of 10-minute value (95%) at interval level
- 95% undershooting of rolling day according to 10-minute interval value according to BEK. 1271 of 11/21/2017 Annex 2, item 2.5

The report supports but does not include as standard:

- Exceedances, B-column
- Rolling inventory of time 12 months back (120 hours account of operation time without filter)

The component columns can also be separated by a space, so the connection between the columns and the components will be clearer.

4.5.15 Report: Operation time, Start/Stop (month + year)

The report calculates the operational status for time and the number of individual kiln lines for:

- Active: Time when the line is in operation
- Start-up: Time when the line is in start-up
- Rundown: Time when the line is in rundown
- Environmental reporting stopped: Time when the line is out of operation and does not report

Active, Start-up and Rundown are calculated as an “Active Total” in order to calculate the line's actual operating hours.

The following is included in the report as standard:

- Detailed event list on page 2 containing all periods of start-up, rundown and stoppage, including any comments

4.5.16 Report: QAL values

The report shows the created QAL2 and QAL3 values grouped by component.

QAL2 values are shown with the entered slope and cut as well as the calibration area.

QAL3 values are shown directly under the QAL2 entered so that it is possible to see the relationship to the created QAL2. The QAL3 view, in addition to the entered zero and span value and the zero and span gas, also includes the estimated slopes and cuttings, including the summarised result.

The report is a day report and will retrieve the relevant QAL2 for each component on the specific date, as well as the QAL3 statements created for the specific date.

4.5.17 Report: Immediate reporting

In cases where selected exceedances have to be reported to the authorities within a short time frame, the immediate report is used. This looks very similar to the comments reports and can be configured to include chosen types of exceedance.

The report includes as standard:

- Exceedances, A-column
- 4-hour exceedances (4 hours in a row with exceedances in the A-column)
- Daily and monthly exceedances
- Interval stop value
- Exceedance of day middle-value (97%)
  In relation to BEK. 1271 of 11/21/2017 Annex 2 item 2.4
  The report will only include indications of exceedances for the individual days. The percentage estimate of the current calendar year will appear from the A-report
- Exceedances of 10-minute value (95%) at interval level

The report supports but does not include as standard:

- Rejected days
- 10 min exceedances (ACC)
- 95% undershooting of rolling day according to 10-minute interval value according to BEK. 1271 of 11/21/2017 Annex 2, item 2.5
- Exceedances, B-column
- Calibration interval: Exceedance of 1 week by 5%
- Calibration interval: Exceedances of 1 week by 40% (Critical/can cause QAL2)
- Calibration interval: Exceedances of 5 weeks by 5% (Critical/can cause QAL2)

4.5.17.1 ReportLoq+ Cloud

The immediate report can be set up as an e-mail delivery and is only sent if there are exceedances to flag up.

4.5.18 Report: CO 10-minute intervals

The day report produces average values for every 10 minutes as well as a status for operations and error in the equipment. This makes it easier to see how the emissions are distributed throughout the day; a min/max statement in the bottom of the report, meanwhile, makes it even easier to see if there have been high emissions during the period.

NB:

- The 10-minute values in the report are not VSTA values and are aggregated no further into LTA values. As such, the report can only be made at day level.

4.5.19 Report: Interval, Graphical

The visual interval report shows emissions and limit values on a monthly basis using graphs. Measured AMS components are calculated by page.

The report makes it easy to assess whether limit values have been complied with for the entire period and is an advantage for systems that use weighted limit values. It should be pointed out that the report only includes final weighted values. Please refer to “Weighted limit values” for documentation of the actual weighting.

The report

- Highlights exceeded days
- Counts rejected days and exceedances of hourly and daily values
- Specifies the highest measured hourly value

NB:

- The report includes all AMS components with an hourly or daily limit value as standard. The AMS components shown may be adjusted as required
- The Excel report includes a table of all hourly and daily values with validation texts, which are not available in the PDF report. The table also includes the confidence intervals and limit values used

4.5.20 Report: QAL2 Valid calibration interval

The annual report shows how many SSTA values are outside the valid calibration interval, as stated in the QAL2 input, so that it is possible to report on whether the plant is within the permitted exceedance limits. The report has been made on a weekly basis according to EN 14181:2014 (E) 6.5.

NB:

- The report doesn’t show QAL2+AST date and, as such, cannot be used on its own as documentation for compliance with 5 weeks of exceedance by 5%.
- The two critical types of exceedance: 5 weeks of 5% and 1 week of 40% will automatically be detected and included in immediate and comment reports for correct debriefing.

4.5.21 Report: Exceeding year to date (A+B column)

The annual report is an inventory of A- and B-column reports on an annual basis.

4.6 Exceedances

Availability: ReportLoq^{+}: Locally ReportLoq^{+} Cloud: www.reportloq.com

The history function to comment and search in exceedances. The function includes several sorting functions in order to be able to locate specific exceedances.

The operator and manager each have their own comment field to write in. This gives the manager the possibility of commenting on exceedances after the operator and in this case the manager's comment will be included in the report instead of the operator's.

The list of exceedances found can be exported to PDF, CSV or XLS.

NB: It is possible to mass comment on the exceedances by using the small check boxes for each exceedance. Mark the exceedances caused by the same event and write a comment.

4.7 Alarms and events

Availability: ReportLoq⁺: Locally ReportLoq⁺ Cloud: www.reportloq.com

The history function to comment and search in alarms and events. Please note that warnings (marked in yellow) cannot be searched for.

The function includes several sorting functions in order to be able to find specific alarms and events and it is possible to filter active alarms which are still at a high level.

The list of found elements can be exported to PDF, CSV or XLS.

4.8 Scheduled downtime

Availability: ReportLoq⁺: No. ReportLoq⁺ Cloud: www.reportloq.com

For planned shutdowns, the date interval can be entered on this page, so that downtime can be estimated in the B-column report.

4.9 Company info

Availability: ReportLoq⁺: Locally ReportLoq⁺ Cloud: www.reportloq.com

Under Company info, it is possible to see how the individual ReportLoq installation is set up. The page shows changes made over time, such as to limit values or replaced components.

The page is structured so that each incineration line is shown with one or more directives. Each directive has its own block, which describes how the environmental configuration has been set up to comply with the plant's environmental permit. The block contains both the general setup that applies to the directive, and a specific configuration for each parameter.

NB: The page can be printed out and as such can serve as documentation for validation against emission limits for the environmental approval.

4.9.1 Static values for peripheral measurements

The peripheral measurements of oxygen, water, pressure and temperature are all necessary to normalise the primary measurements. ReportLoq therefore collects the peripheral measurements and uses them for correction, as also described in EN 17255-1:2019 (Annex B). A number of static values are required in order to perform the normalisation.

Replacement values are needed for all the peripheral measurements to avoid discarding the primary measurements if the peripheral measurement is under maintenance or faulty. These can be static or use

the last good value within the last month. In the scenario where the last good value is desired and no such value exists, the static value is used as a replacement value.

The maximum value for oxygen is used if the corrected oxygen is above the stated value. The value ensures that the correction is not too high if the oxygen is close to atmospheric air.

The reference value for oxygen is used during calculations of the correction factor for oxygen.

*The reference value*s for temperature and pressure are for informative purposes only and are not used during calculations.

4.9.2 Other parameters for the directive

Good factor shows the percentage of valid FLD values required to produce an STA value. Maintenance or failure of the measuring equipment can count down to the good factor, which will lead to the STA value being rejected in the event of an underrun and thus not included in the LTA value.

Active minutes per day is the limit for how long the plant must be under operation before daily values can be generated. NB: Actual operation time is calculated differently in Classic and EN 17255:

- EN 17255: The figure is calculated on the basis of intervals not marked with "EN". Active minutes are counted on the basis of the number of STA * STA minutes.
- Classic: The figure is the actual number of minutes the plant has been active. All STA intervals with active minutes are counted.

Active minutes per month is the limit for how long the plant must be under operation before monthly values can be generated. Actual operation time is calculated on an equal basis with "Active minutes per day".

Rejected intervals are the number of STA intervals that may be rejected in one day without rejecting the day.

STA minutes are the total amount of minutes in an STA value. This is always 10, 20, 30 or 60 minutes.

Calibration handled as an error[14] specifies whether FLD values are rejected during maintenance or are locked to the last good value.

According to EN 17255[15] is the quality marking, which proves that calculations have been performed according to the standard.

Comments for B exceedances are required means that the operator is required to comment if the B value is exceeded. B exceedances will not be shown in the alarm list on the CEMS page if this is set to "No".

[14] This is only possible for calculations in Classic
[15] Only possible with EN 17255-1:2019 calculations

4.10 QAL

4.10.1 Preface

The QAL module in ReportLoq is used to check that AMS is complying with the quality requirements in relation to EN14181.

The quality requirement for AMS is normally specified in executive orders or environmental approvals. The quality requirement can also be defined by the installation itself. An AMS without a quality requirement cannot be checked in a variability test with QAL2 or AST, but it is certainly possible to calculate and establish a calibration function.

4.10.2 QAL2 registration

QAL2 covers the installation of AMS itself at the measurement point, and consists of a function test and a series of parallel measurements.

The aim of QAL2 is to establish a calibration function, a valid calibration interval and to perform a variability test or test of the AMS measurement capability in relation to the quality requirement.

4.10.2.1 Components

Components are shown in Figure 9 and provide an overview of components, QAL2, QAL3 and AST values.

Component	Analyser range	QAL2 (A)	QAL2 (B)	QAL3 (A)	QAL3 (B)	σ_ams	QAL2 Date	QAL3 Date	AST Date
Flow	0 - 220,000	100.000	1.200	0.000	0.883	1.08	Mar 6, 2020 New List	Nov 4, 2020 New List Calib. Gas	New
H2O	0 - 30					1.7	New List	Calib. Gas	
O2	0 - 25					0.62	New List	Calib. Gas	
HF	0 - 5					0.4	New List	Calib. Gas	
SO2	0 - 200	0.500	1.200			5.05	Jul 4, 2020 New List	New Calib. Gas	New
Dust (R2)	0 - 100					0.12	New List	Calib. Gas	
CO2	0 - 20	0.000	1.000			0.69	Feb 21, 2018 New List	New Calib. Gas	New
NOx	0 - 850						New List	Calib. Gas	
NO2	0 - 50					2.74	New List	Calib. Gas	
NO	0 - 500					11.65	New List	Calib. Gas	
HCl	0 - 80	3.456	1.234			1.14	Jul 29, 2018 New List	New Calib. Gas	New
TOC	0 - 30	-0.550	1.220	-2.857	1.014	0.96	Jan 15, 2017 New List	Jul 4, 2020 New List Calib. Gas	New
NH3	0 - 15					1.25	New List	Calib. Gas	
CO	0 - 200	0.300	0.980	-0.067	1.082	2.52	Nov 17, 2016 New List	Oct 31, 2018 New List Calib. Gas	Jan 31, 2018 New List

Figure 9 - QAL2 Components

- Component: Measurement component
- Monitoring interval: Monitoring interval component
- QAL2 (A): Bx + A, value taken from QAL2 report, value implemented and used automatically in ReportLoq calculations.
- QAL2 (B): Bx + A, value taken from QAL2 report, value implemented and used automatically in ReportLoq calculations.
- QAL3 (A): Bx + A, total value calculated by ReportLoq, value implemented and used automatically in ReportLoq calculations.
- QAL3 (B): Bx + A, total value calculated by ReportLoq, value implemented and used automatically in ReportLoq calculations.
- σ_ams: Sigma value stated by analyser supplier, can only be changed by Olicem. There may be a need to optimise the value in relation to AMS installation/environment.
- QAL2 date: Date for last input QAL2

- QAL3 date: Date for last input QAL3

4.10.2.2 New QAL2 input

After calibration and check of continuously registered monitor instruments in relation to EN14181, the fields below shall be completed in the QAL system. The values can be found in the SRM (parallel monitor institute's) QAL2 report.

For calculated components (e.g. NOx = NO x 1,53 + NO2), which are a product of 1 or more sub-components, QAL2 values must be entered for both main and sub-components (e.g. NOx, NO, NO2). This ensures that the control charts are reset. For sub-components (e.g. NO & NO2), slope = 1 and offset = 0 are typically used. For main components (e.g. NOx), values from the SRM report are typically used.

You must either complete the fields, Intercept (A) (mA) and Slope (B) (mA) or Intercept (A) and Slope (B), the choice depends on how this is indicated in the QAL2 report.

Select new QAL2, see Figure 9 - QAL2 Components:

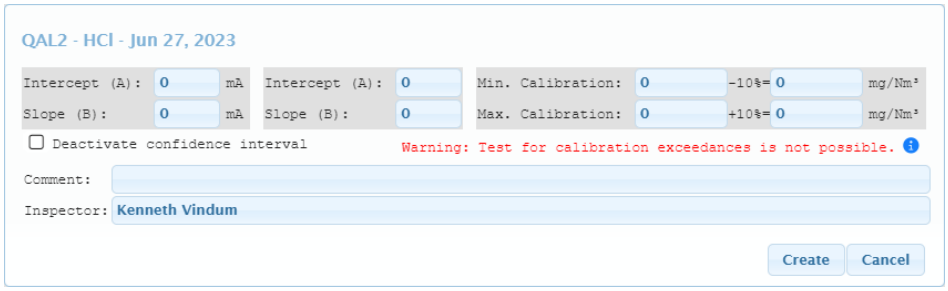


Figure 10- QAL2 input

- Slope (B) mA: Value in mA; the field is normally used for dust; it is **important** that the AMS monitoring interval is input correctly in ReportLoq, it can be checked for each individual component in Company info (see Figure 12 - Company info).
- Intercept (A) mA: Value in mA; the field is normally used for dust; it is **important** that the AMS monitoring interval is input correctly in ReportLoq, it can be checked for each individual component in Company info (see Figure 12 - Company info).
- Slope (B): Bx + A, value implemented and used automatically in ReportLoq calculations; NB: The value shall be available with NOx.
- Intercept (A): Bx + A, value implemented and used automatically in ReportLoq calculations; NB: The value shall be available with NOx.
- Min. calibration: No 10% supplement, the QAL system itself adds 10% in relation to EN14181
- Max. calibration: No 10% supplement, the QAL system itself adds 10% in relation to EN14181
- Deactivate confidence interval: Option to disable confidence interval in connection with dumped QAL2
- QAL3 type Defines the QAL3 control chart: Shewhart / Cusum / None

- Comment: Free text field
- Inspector: Responsible for inputting
- Create: Create or save input
- Cancel: Undo input

4.10.2.3 Check of QAL2 A & B values based on A (mA) and B (mA)

The fields called Intercept (A) mA and Intercept (B) mA are typically used for dust monitors only.

Example:

See Figure 11- QAL2 A & B Values.

If there is a B_{mA}=0.656 and an A_{mA}= -2.624 in the QAL2 report, you can find the QAL2 range by inserting x=20_{mA} in the Bx+A formula.

QAL2 range: B_{mA} x+A_{mA}= 0.656*20+-2.624=> 0 - 10.5 mg/m3.

To check the A & B values calculated by ReportLoq, you can insert x=max monitoring interval in the formula (see Figure 12 - Company info) to check whether it gives the same range.

Range; x=max range =100: Bx+A=0.105*100+0=> 0 - 10.5 mg/m3.

QAL2 A & B values based on A ($_{mA}$) and B ($_{mA}$):

QAL2 – Dust

Dato	Intercept (A) (mA)	Slope (B) (mA)	Intercept (A)	Slope (B)	Min. Calibration	Max. Calibration	Inspector	Comment	Delete
Oct 2, 2015	-2.624	0.656	0	0.105	0	0	Carsten Malthe Birkemose	QAL Manual	

Figure 11- QAL2 A & B Values

Company info:

Dust

Analyser:	FEW 200 (Sick)
Is ReportLoq normalised for:	H2O, O2, Press, Temperature
Analyser σ_ams:	1.50
Analyser range:	0 - 100 mg/Nm³
Validation:	Dust monitor failure, Dust monitor connection lost, Dust monitor calibrating
The value is discarded if Kiln isn't running:	Yes
Exceedances are included in 60 hour accounting:	Yes
Limit value (A):	30 mg/Nm³
Limit value (B):	10 mg/Nm³
Daily limit value:	10 mg/Nm³
Confidence interval:	3 mg/Nm³

Figure 12 - Company info

4.10.2.4 QAL2 list

Select List QAL2, see Figure 9 - QAL2 Components.

The list provides a comprehensive view of all previous QAL2 inputs on the component.

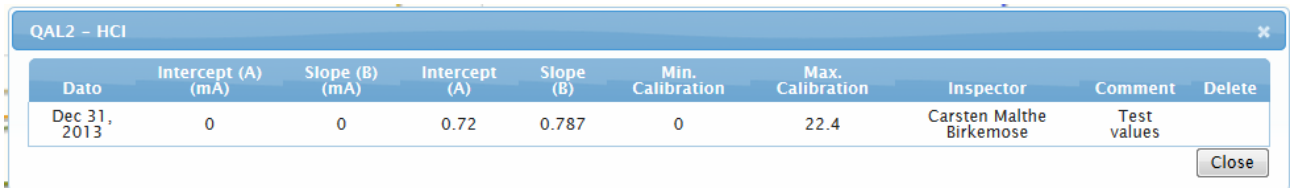


Figure 13 - QAL2 list

- Date: Date of commencement
- Intercept (A) mA: Value in mA; the field is normally used for dust; it is **important** that the AMS monitoring interval is input correctly in ReportLoq, it can be checked for each individual component in Company info (see Figure 12 - Company info).
- Slope (B)0 mA: Value in mA; the field is normally used for dust; it is **important** that the AMS monitoring interval is input correctly in ReportLoq, it can be checked for each individual component in Company info (see Figure 12 - Company info).
- Intercept (A): Bx + A, value implemented and used automatically in ReportLoq calculations.
- Slope (B): Bx + A, value implemented and used automatically in ReportLoq calculations.
- Min. calibration: No supplement, the QAL system itself adds 10% to the value
- Max. calibration: No supplement, the QAL system itself adds 10% to the value
- Inspector: Responsible for inputting
- Comment: Free text field
- Delete: Deletion of QAL2 record is possible until date is exceeded, Olicem must be subsequently contacted in order to delete the input.

4.10.3 QAL3 registration (CUSUM)

QAL 3 is a continuous check of whether AMS is still functioning as intended.

To this end, you must test at equal intervals the AMS' deflection at AMS zero and with a reference point that should normally be around 80% of the monitoring interval. AMS deflection is normally tested with a test gas or test gas surrogate, such as an optical filter

QAL3 registration in ReportLoq is used to determine drift and precision by looking at the statistical development of AMS over time, also called CUSUM check card.

The CUSUM check card assesses whether the instrument has drifted too much (systematic deviation), or whether the instrument no longer has the monitoring precision that it once had (random deviation). If this method is used, with drift the instrument can be adjusted "back", and with increased monitoring uncertainty you should call the service department.

4.10.4 For Automatic QAL3, see section 4.10.4 - QAL3 registration (Shewhart)

The DAHS system can be set up to use the Shewhart rule, as described in EN 14181, to assess the stability of the measuring equipment at QAL3.

The Shewhart rule is used to check whether individual measurements deviate unacceptably from the expected level. The purpose is to provide a clear and unambiguous basis for when to adjust the instrument.

Each measurement is compared with the expected mean value and its calculated standard deviation (σ).

Within ±2σ: The measurement is considered to be in normal operation.

Outside ±2σ: An alarm is triggered, indicating that the equipment is no longer within the permitted limits. If a measurement deviates more than ±2σ from the mean value, you are **required to adjust the equipment**. This is a normative requirement in EN 14181, and therefore the system always flags such a deviation as an alarm.

The Shewhart rule is therefore the primary method for ensuring that the meter complies with the requirements of EN 14181.

4.10.4.1 Westgard rules (support tool)

In addition to Shewhart, the DAHS also displays a set of Westgard rules. Whereas Shewhart evaluates individual measurements in relation to ±2σ, the Westgard rules analyse sequences of measurements. The purpose is to provide early warnings of systematic errors or incipient drift that have not yet triggered a Shewhart alarm.

The Westgard rules are an integral part of DAHS, but they are not part of EN 14181 and are therefore not mandatory to respond to. You can choose whether to adjust the meter based on these signals, but they should be considered recommendations that can help detect and understand developments in the meter's behaviour.

Westgard rules applied:

- 2 out of 3 measurements >1σ on the same side – indicates systematic offset.
- consecutive measurements on the same side of the mean value – indicates a persistent error.
- consecutive measurements increasing or decreasing (trend) – indicates that the equipment is gradually drifting.

The Westgard rules can help you better understand the behaviour of the meter and plan service or maintenance in a timely manner.

4.10.4.1.1 Z-score

For each QAL3 measurement, the system calculates a z-score, which indicates how many standard deviations (σ) the measurement is from the expected span value.

A z-score close to 0 means that the measurement is within the normal range.

A higher absolute z-score (e.g. >2) indicates that the measurement is outside the normal range and may therefore trigger a Shewhart alarm.

The Z-score is not a requirement in EN 14181, but it is shown as additional information. The purpose is to provide a clearer picture of how significant a deviation is. This helps you distinguish between a marginal exceedance and a clear error, and can be a support in troubleshooting or dialogue with service personnel.

Example 1:
Suppose that the expected span value is 100 and the calculated standard deviation (σ) is 2.14.
If a control measurement gives **104.0**, the z-score is calculated as:

$$104.0 - 100.0 = 4.04.0 \div 2.14 = \mathbf{1.87}$$

The measurement is therefore 1.87σ above the span value and is thus still within the Shewhart limit of ±2σ.

Example 2:
If a control measurement gives **105.0**, the z-score is calculated as:

$$105.0 - 100.0 = 5.0$$
$$5.0 \div 2.14 = \mathbf{2.34}$$

The measurement is 2.34σ above the span value and will therefore trigger a Shewhart alarm.

4.10.4.1.2 Westgard rule: 2 out of 3 measurements >1σ on the same side

This rule is used to detect systematic shifts that do not necessarily trigger the Shewhart alarm at 2σ. If two out of three consecutive measurements are more than 1σ away from the mean on the same side, the probability of this happening by chance is very small (below CI95). By applying this rule, you can detect small but persistent shifts that would otherwise be hidden within normal variation.

4.10.4.1.3 Westgard rule: 6 consecutive measurements on the same side of the mean value

This rule detects shifts that gradually become apparent over time. When six consecutive measurements are on the same side of the mean, it is statistically unlikely that this is a coincidence (the probability is less than 5% relative to CI95). By applying this rule, you get a clear signal that there may be a persistent systematic error in the meter, even though no single measurement has crossed the Shewhart limit of 2σ.

4.10.4.1.4 Westgard rule: 5 consecutive measurements with an increasing or decreasing trend

This rule is used to detect drift in the meter. If five consecutive measurements either increase or decrease, it indicates that the equipment is slowly drifting away from the mean value. The probability of such a trend occurring randomly within CI95 is very low. The rule allows you to respond to incipient drift early, so you can plan for adjustment or service before the Shewhart alarm is triggered.

The 'Automatic QAL3' option.

4.10.4.2 Calibration gas

By inputting the concentration of the calibration gas, it is easier to provide QAL3 inputs.

There is no requirement for the gasses to be input, but if the concentration, expiry dates and calibration gas certificate numbers are recorded, it is a very useful tool for administering the gases.

4.10.4.3 New calibration gas input

New calibration gas concentration input by selecting New Calib. Gas (see Figure 9 - QAL2 Components)

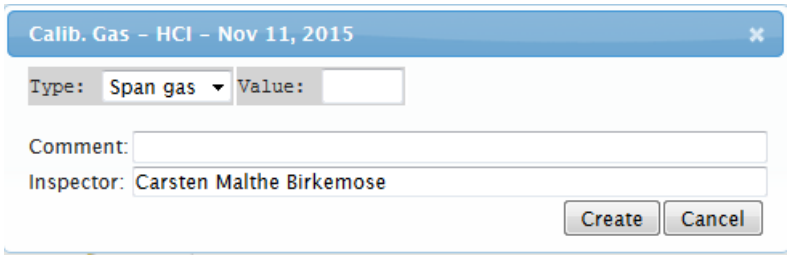


Figure 14 - Calibration gas input

- Type: Select Span Gas Or Zero Gas
- Value: Calibration gas value
- Inspector: Responsible for inputting
- Comment: Free text field

4.10.4.3.1 Calibration gas list.

Previously entered calibration gas inputs can be browsed by selecting List calib. gas (see Figure 9 - QAL2 Components)

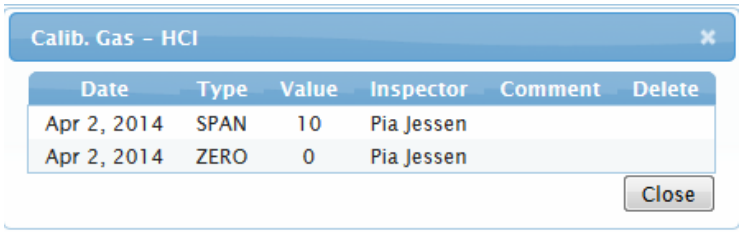


Figure 15 - Calibration gas list

- Date: Date of commencement
- Type: Span Gas Or Zero Gas
- Value: Calibration gas value
- Inspector: Responsible for inputting
- Comment: Free text field
- Delete: Deletion of calibration gas record is possible until date is exceeded, Olicem must be subsequently contacted in order to delete the input.

4.10.4.4 New QAL3 input

Before a new QAL3 can be input, AMS must be verified with test gas at zero and span point. The values are read off on AMS and input into the QAL software.

It is not possible to enter QAL3 values for calculated components (e.g. NOx = NO x 1.53 + NO2), which are a product of 1 or more sub-components. QAL3 values must be entered for sub-components (NO & NO2).

The frequency for QAL3 inputs can vary from 1 week to every 6 months depending the recommendations of the AMS supplier.

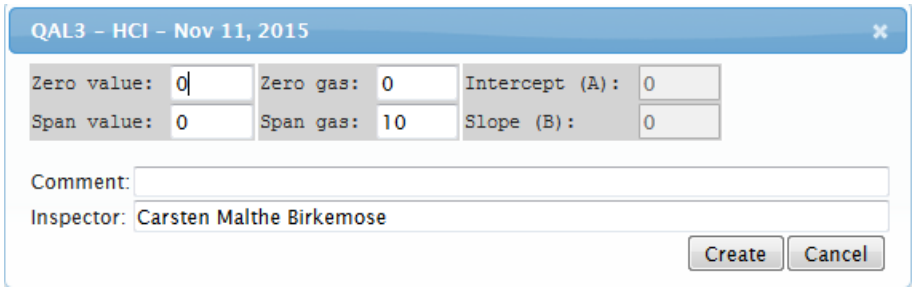


Figure 16 - QAL3 input

- Zero value: Value read off on analyser by pressing Zero gas
- Span value: Value read off on analyser by pressing Span gas
- Zero gas: Zero gas concentration is shown automatically if the calibration gas has been entered, (see Figure 14 - Calibration gas input)
- Span gas: Span gas concentration is shown automatically if the calibration gas has been entered, (see Figure 14 - Calibration gas input)
- Intercept (A): QAL3 A calculated by ReportLoq QAL programme
- Slope (B): QAL3 B calculated by ReportLoq QAL programme

4.10.4.4.1 Adjustment query

The component will require adjustment if CUSUM detects that the component has drifted too much in relation to the sigma value. A query will pop up when the QAL3 value is entered as a result of the requirement.

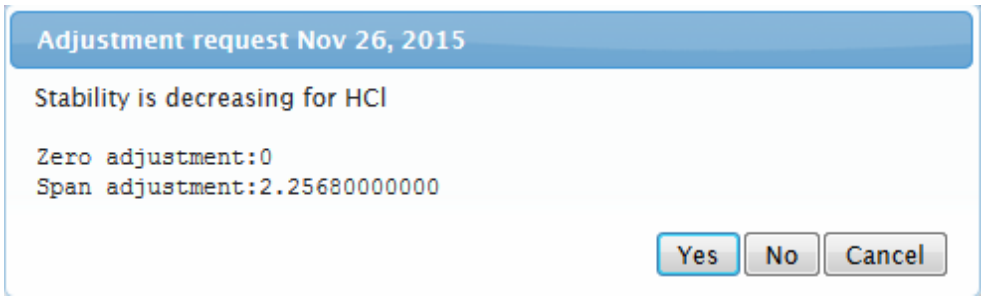


Figure 17 - Adjustment query

- Zero adjustment: Zero adjustment or shifting of zero point in the curve for the current QAL3 input. Previous adjustments must be included in the calculation for the total Bx+A.
- Span adjustment: Span adjustment or shifting of curve in the span point for the current QAL3 input. Previous adjustments must be included in the calculation for the total Bx+A.

The following options are now available:

- Yes: Update of control chart, control chart is reset, adjustment is updated and component is marked as adjusted. New QAL3 Bx+A implemented.
- No: No Update of control chart, the current QAL3 input will not be queried at the next calculation. This option is used if it is assumed that the next QAL3

input will result in no adjustment being required.

- Cancel: Used if the input is incorrect and the Yes or No options cannot be used.

4.10.4.4.2 Instability detected.

A query will be displayed if the component has drifted more than permitted. The QAL program has detected that the analyser is defective and that the analyser must be serviced.

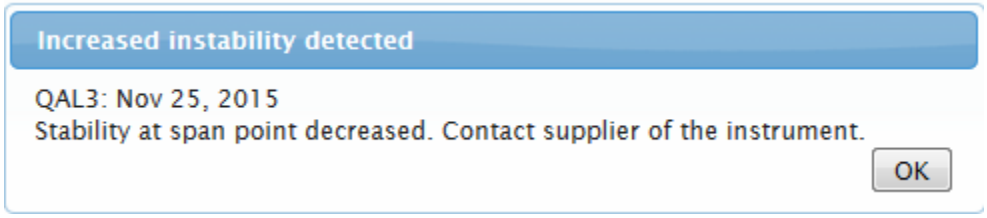


Figure 18 - Instability detected

4.10.4.5 QAL3 list

Select List QAL3, see Figure 9 - QAL2 Components.

The list provides a comprehensive view of all previous QAL3 inputs on the component.

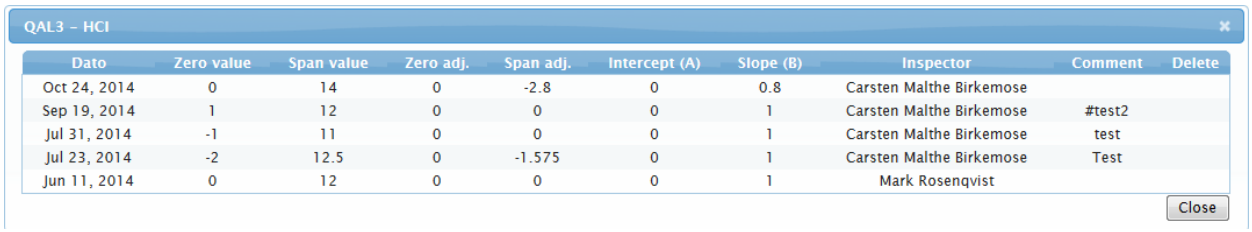


Figure 19 - QAL3 list

- Date: Date of commencement
- Zero value: Value read off on analyser by pressing Zero gas
- Span value: Value read off on analyser by pressing Span gas
- Zero adj.: Zero adjustment calculated by ReportLoq QAL programme
- Span adj.: Span adjustment calculated by ReportLoq QAL programme
- Intercept (A): QAL3 A calculated by ReportLoq QAL programme
- Slope (B): QAL3 B calculated by ReportLoq QAL programme

4.10.4.5.1 QAL3 list expanded.

To see the expanded QAL3 list, select a QAL3 record in the QAL3 list.

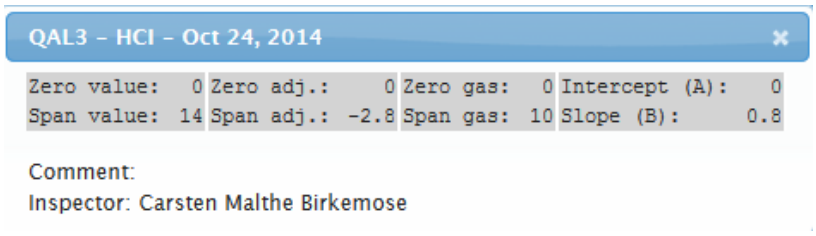


Figure 20 - QAL3 list expanded

- Zero value: Value read off on analyser by pressing Zero gas
- Span value: Value read off on analyser by pressing Span gas
- Zero adj.: Zero adjustment calculated by ReportLoq QAL programme
- Span adj.: Span adjustment calculated by ReportLoq QAL programme
- Zero gas: Zero gas concentration
- Span gas: Span gas concentration
- Intercept (A): QAL3 A calculated by ReportLoq QAL programme
- Slope (B): QAL3 B calculated by ReportLoq QAL programme

4.10.4.6 QAL3 trend.

The CUSUM check card is plotted in a coordinates system that illustrates how much AMS drifts as a function over time.

4.10.4.6.1 Span check:

Selecting the span tab illustrates how AMS has drifted at the span point.

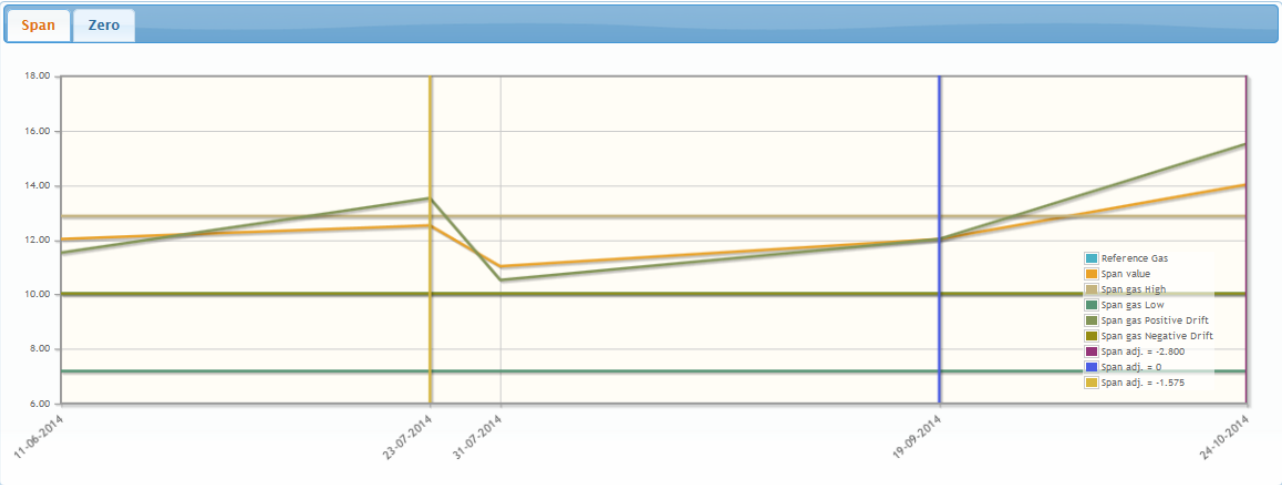


Figure 21 - Trend span check:

- Reference gas: Span gas concentration.
- Span value: Span value read off.
- Span gas high: Upper alarm limit
- Span gas low: Lower alarm limit
- Span gas positive drift: Accumulated positive drift
- Span gas negative drift: Accumulated negative drift
- Span adj.: Vertical line indicates that adjustment has taken place.

4.10.4.6.2 Zero check:

Selecting the Zero tab illustrates how AMS has drifted at the zero point.

- Reference gas: Span gas concentration.
- Zero value: Zero value read off.
- Zero gas high: Upper alarm limit
- Zero gas low: Lower alarm limit
- Zero gas positive drift: Accumulated positive drift

- Zero gas negative drift: Accumulated negative drift
- Zero adj.: Vertical line indicates that adjustment has taken place.

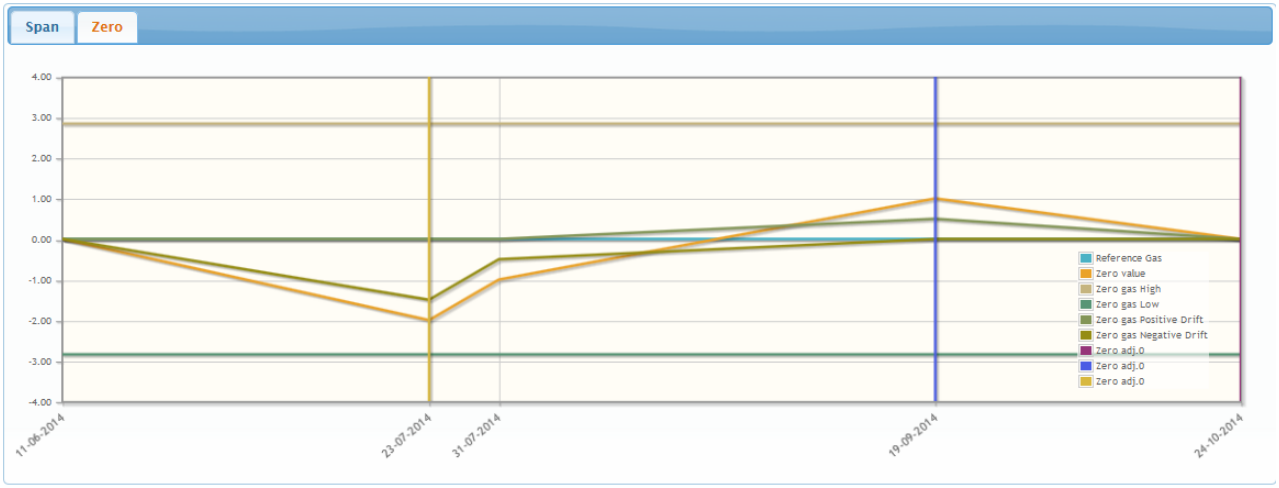


Figure 22 - Trend zero check:

4.10.4.7 NOx and QAL values

The following considerations must be taken into account before applying QAL values on NO_x.

SRM used in connection with QAL2 can measure both NO and NO_2 and therefore calculate NO_x. Subsequently you will need to compare SRM and AMS to be able to calculate NO_x QAL2A & B values.

It is not possible to provide QAL3 verification on NO_x, so QAL3 is provided on NO and NO_2 instead.

The examples below show how NO_x is calculated in ReportLoq:

4.10.4.7.1 NOx QAL: NO and NO2 AMS.

<u>NO_2 according to:</u>

NO_{2_raw} = NO_{2_raw}

NO_{2_QAL3} = NO_{2_QAL3B} * NO_{2_raw} + NO_{2_QAL3A}

NO_{2_QAL2} = NO_{2_QAL2B} * NO_{2_QAL3} + NO_{2_QAL2A}

<u>NO according to:</u>

$NO_{\_raw}$ = $NO_{\_raw}$

$NO_{\_QAL3}$ = $NO_{\_QAL3B}$ * $NO_{\_raw}$ + $NO_{\_QAL3A}$

$NO_{\_QAL2}$ = $NO_{\_QAL2B}$ * $NO_{\_QAL3}$ + $NO_{\_QAL2A}$

<u>NO_x according to:</u>

NO_{x_raw} = NO_{2_raw} + $NO_{\_raw}$ *1.53

NO_{x_QAL3} = NO_{2_QAL3} + $NO_{\_QAL3}$*1.53

NO_{X_QAL2} = NO_{X_QAL2B} * NO_{x_QAL3} + NO_{x_QAL2A}

4.10.4.7.2 NOx QAL: NO and NO2_converter AMS.

NO according to:

$NO_{\_raw}$ = $NO_{\_raw}$ + NO_2 converted to NO

$NO_{\_QAL3}$ = $NO_{\_QAL3B}$ * $NO_{\_raw}$ + $NO_{\_QAL3A}$

$NO_{\_QAL2}$ = $NO_{\_QAL2B}$ * $NO_{\_QAL3}$ + $NO_{\_QAL2A}$

NO_x according to:

NO_{x_raw} = $NO_{\_raw}$ *1.53

NO_{x_QAL3} = $NO_{\_QAL3}$*1.53

NO_{X_QAL2} = NO_{X_QAL2B} * NO_{x_QAL3} + NO_{x_QAL2A}

4.10.5 QAL3 registration (Shewhart)

The DAHS system can be set up to use the Shewhart rule, as described in EN 14181, to assess the stability of the measuring equipment at QAL3.

The Shewhart rule is used to check whether individual measurements deviate unacceptably from the expected level. The purpose is to provide a clear and unambiguous basis for when to adjust the instrument.

Each measurement is compared with the expected mean value and its calculated standard deviation (σ).

Within ±2σ: The measurement is considered to be in normal operation.

Outside ±2σ: An alarm is triggered, indicating that the equipment is no longer within the permitted limits. If a measurement deviates more than ±2σ from the mean value, you are **required to adjust the equipment**. This is a normative requirement in EN 14181, and therefore the system always flags such a deviation as an alarm.

The Shewhart rule is therefore the primary method for ensuring that the meter complies with the requirements of EN 14181.

4.10.5.1 Westgard rules (support tool)

In addition to Shewhart, the DAHS also displays a set of Westgard rules. Whereas Shewhart evaluates individual measurements in relation to ±2σ, the Westgard rules analyse sequences of measurements. The purpose is to provide early warnings of systematic errors or incipient drift that have not yet triggered a Shewhart alarm.

The Westgard rules are an integral part of DAHS, but they are not part of EN 14181 and are therefore not mandatory to respond to. You can choose whether to adjust the meter based on these signals, but they should be considered recommendations that can help detect and understand developments in the meter's behaviour.

Westgard rules applied:

- 2 out of 3 measurements >1σ on the same side – indicates systematic offset.
- consecutive measurements on the same side of the mean value – indicates a persistent error.
- consecutive measurements increasing or decreasing (trend) – indicates that the equipment is gradually drifting.

The Westgard rules can help you better understand the behaviour of the meter and plan service or maintenance in a timely manner.

4.10.5.1.1 Z-score

For each QAL3 measurement, the system calculates a z-score, which indicates how many standard deviations (σ) the measurement is from the expected span value.

A z-score close to 0 means that the measurement is within the normal range.

A higher absolute z-score (e.g. >2) indicates that the measurement is outside the normal range and may therefore trigger a Shewhart alarm.

The Z-score is not a requirement in EN 14181, but it is shown as additional information. The purpose is to provide a clearer picture of how significant a deviation is. This helps you distinguish between a marginal exceedance and a clear error, and can be a support in troubleshooting or dialogue with service personnel.

Example 1:
Suppose that the expected span value is 100 and the calculated standard deviation (σ) is 2.14.
If a control measurement gives **104.0**, the z-score is calculated as:

$$104.0 - 100.0 = 4.04.0 \div 2.14 = \mathbf{1.87}$$

The measurement is therefore 1.87σ above the span value and is thus still within the Shewhart limit of ±2σ.

Example 2:
If a control measurement gives **105.0**, the z-score is calculated as:

$$105.0 - 100.0 = 5.0$$
$$5.0 \div 2.14 = \mathbf{2.34}$$

The measurement is 2.34σ above the span value and will therefore trigger a Shewhart alarm.

4.10.5.1.2 Westgard rule: 2 out of 3 measurements >1σ on the same side

This rule is used to detect systematic shifts that do not necessarily trigger the Shewhart alarm at 2σ. If two out of three consecutive measurements are more than 1σ away from the mean on the same side, the probability of this happening by chance is very small (below CI95). By applying this rule, you can detect small but persistent shifts that would otherwise be hidden within normal variation.

4.10.5.1.3 Westgard rule: 6 consecutive measurements on the same side of the mean value

This rule detects shifts that gradually become apparent over time. When six consecutive measurements are on the same side of the mean, it is statistically unlikely that this is a coincidence (the probability is less than 5% relative to CI95). By applying this rule, you get a clear signal that there may be a persistent systematic error in the meter, even though no single measurement has crossed the Shewhart limit of 2σ.

4.10.5.1.4 Westgard rule: 5 consecutive measurements with an increasing or decreasing trend

This rule is used to detect drift in the meter. If five consecutive measurements either increase or decrease, it indicates that the equipment is slowly drifting away from the mean value. The probability of such a trend occurring randomly within CI95 is very low. The rule allows you to respond to incipient drift early, so you can plan for adjustment or service before the Shewhart alarm is triggered.

4.10.6 The 'Automatic QAL3' option

This feature makes it possible to automatically document Span and Zero verification of the measured components.

When using the feature, ReportLoq monitors whether the analyser performs verification as expected and creates QAL3 records when the analyser's values are within the expected uncertainty.

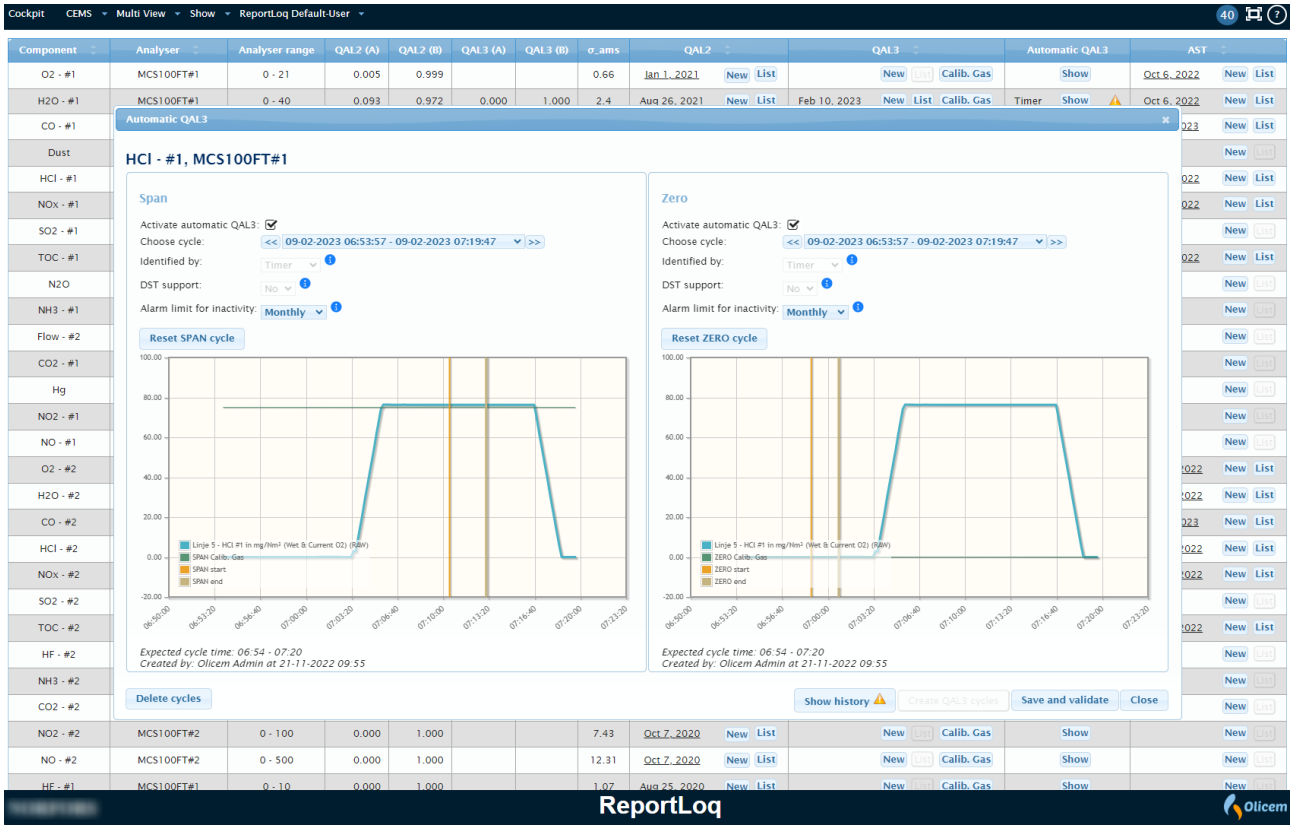
The solution means that operators do not need to manually create QAL3 records with registered Span and Zero values. Only in cases where the registered values are outside the expected uncertainty or if the analyser verification fails completely, the operator will be involved.

4.10.6.1 Creating a QAL3 cycle

When the Automatic QAL3 option is active, the functions are accessed via the "Automatic QAL3" column on the QAL page. Each measurement component must be created separately in the feature. For multi-component analysers, it is strongly recommended to check the order of the analyser's verifications so that ReportLoq can be set up correctly.

The graphical interface is divided into two parts. In the left side, verification of SPAN values is set up. The right side is where you configure ZERO.

Note: It is recommended to fill in SPAN before NUL, as the content of the list under "Select cycle" for NUL only contains verifications performed on the day selected in SPAN.



4.10.6.1.1 Enable automatic QAL3

Only setups where both ZERO and SPAN are enabled are active. Both a created QAL2 registration and expected control values for QAL3 are required to activate the configuration. Control values must be entered as "calibration gases".

4.10.6.1.2 Select cycle

Automatic QAL3 setups can only be created from already performed verification cycles. The cycle selection list contains the periods in which ReportLoq has detected that the analyser has verified its values. An empty list means that ReportLoq has not yet registered any cycles and that the setup cannot be started yet.

The list initially contains all verifications performed on the meter in the past year. After selecting a cycle, the list is reduced to the items that fulfil the selected conditions for the cycle.

4.10.6.1.3 Identified by

The automated function makes use of the analyser's verification signal. Only in cases where the meter sends such a signal and where the analyser performs its verification cycle according to one of the patterns below, ReportLoq's automated QAL3 can be used.

- **Timer**
  ReportLoq recognises the analyser's verification based on a specific time of day and will only match new verifications that are within 2 minutes of the original verification. It is therefore important that the analyser and DAHS system are both set up to synchronise the time[16].

- **Period of time**
  ReportLoq recognises the analyser's verification based on the duration of the verification with a tolerance of one minute. This method is often used to verify e.g. dust meters that do not have an internal clock built in and therefore cannot be expected to perform the cycle at specific times.

- **Other patterns**
  Manual verifications of the analysers or other patterns than the ones mentioned above are not supported. Instead, please refer to the standard QAL3 function, where the operator creates the QAL3 registration based on the read Zero and Span.

Note: ReportLoq will disregard seconds when identifying automatic QAL3 events. Assessment of the matches of whether events are automatic QAL3 events is done on minutes only.

4.10.6.1.4 DST support

If the analyser is configured to verify at specific time of day and performs correction for summer-winter time, set the selection to "Yes". The selection is only relevant when selecting "Timer".

4.10.6.1.5 Stopping automatic QAL3 on instability and adjustment requests

Once ReportLoq has identified an instability or adjustment request, future QAL3 verifications of the meter will be paused until the incident is handled.

In case of an adjustment request, QAL3 must be created manually. See section 4.10.6.2.

In case of an instability, the meter must be inspected.

[16] Note that the DAHS system can be configured to act as an NTP server for AMS systems

In both cases, the event must finally be acknowledged by pressing ‘ignore’. Only then will QAL3 automatically resume.

4.10.6.1.6 Inactivity alarm limit

The limit indicates when you will be notified if the analyser's verification cycle fails.

Alarms are displayed in the Cockpit on the QAL page and in the alarm list for the combustion line. In cloud-based setups, the alarm can also be sent by email.

Note that one day is added to the selected setup to avoid alarms on analysers that run on the same cycle as the selected alarm limit.

4.10.6.1.7 Marking verification on cycle

The graph with the selected verification shows measured values for the entire duration of the cycle. Since only part of the cycle can be used for calculating SPAN and ZERO, select the desired area on the graph.

When the area is selected, the "Identified by" and "DST support" fields are locked and the list of cycles is reduced to show only the elements that fulfil the selected conditions. To unlock the fields, the cycle must be reset.

Note: The average for the selected period is subtracted 15% time at both ends of the period to avoid small shifts in the meter's measurement period affecting the result. However, it is still recommended to consider a conservative measurement period as indicated on the graph to ensure that measurement values are always stable.

4.10.6.2 Manual creation of QAL3 from cycle

Historical QAL3 verifications can be used for QAL3 creation when automatic QAL3 is active for both SPAN and ZERO. First select the relevant cycle. Then press "Save and validate". After this, the "Create QAL3 from cycles" function can be used.

The function is relevant in the following situations:

- Immediately after creating the Automatic QAL3 cycle
- When instability or drift is detected on the analyser

Newly created QAL3 registrations are always valid from midnight.

4.10.6.3 History and alarms

In the history function, you can see when ReportLoq has last:

- Created new QAL3 registrations
- Detected instability
- Detected an adjustment request
- Detected that the inactivity limit for the QAL3 module has been exceeded

Instability, adjustment requests and inactivity all result in alarms. If instability and adjustment requests are detected, automatic QAL3 operation stops until the alarm is either cancelled or until a QAL3 is manually created.

If inactivity alarms are ignored without further action, there is a risk that the alarm will repeat shortly afterwards. In this case, it is recommended to either check how the inactivity can be resolved or increase the inactivity limit.

4.10.6.3.1 Normal procedure for accepting an adjustment request

Once ReportLoq has registered an adjustment request, it can be found in the history of the component. By selecting "Show" in the history, the component's measurement values under SPAN and ZERO are displayed together with the adjustment request. The adjustment can then be accepted and QAL3 is created.

4.10.7 AST registration.

Registration of the date of AST is necessary to check for calibration exceedances according to EN 14181.

EN 14181:2014:

- More than 5 % of the number of AMS measured values calculated over this weekly period (based on standardised calibrated values) are outside the valid calibration range for more than 5 weeks in the period between two AST or QAL2 and AST.

In addition, there is the option to:

- Use the calibration interval defined in connection with the AST

- Disable the confidence interval in case of AMS dumped AST

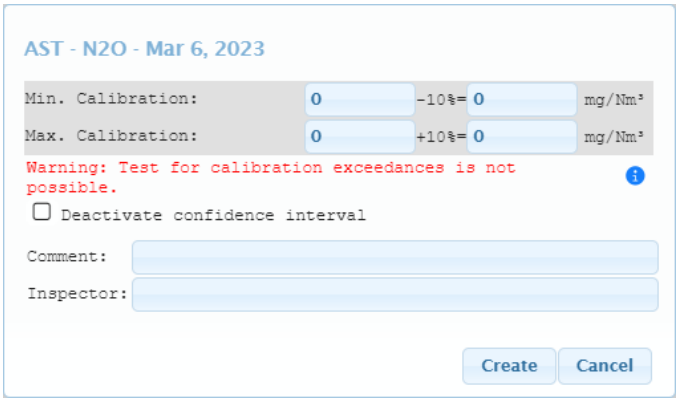


Figure 23: AST registration.

- Date: Effective date
- Min. Calibration: Without deduction, the QAL system adds 10% according to EN 14181 if entered without deduction.
- Max. Calibration: Without deductions, the QAL system adds 10% according to EN 14181 if entered without deductions.
- Disable confidence interval: Indicates if confidence interval is disabled
- Note: Free text field
- Inspector: Responsible for entry

4.11 Trends

Availability: ReportLoq+: Locally ReportLoq+ Cloud: www.reportloq.com

The trend function in ReportLoq provides the possibility of trending logged values while at the same time viewing associated meta information. FLD data can, for instance, be trended with associated operational and analyser status, which makes it possible to see whether the reading was made during use of the kiln and whether the analyser was placed in normal operation, or was calibrating or was in error mode. Please note that it is necessary to mark the "10-second" box to see meta-data.

LTA constitutes the day and monthly average, and includes both the estimated interval value used for weighting against excesses and the green value used for calculating taxes. This also includes the validation text from the interval report and "FLD basis" that reports how many measurements comprisethe average.

It is possible to trend

- FLD values (raw data)
  View of actual measurements

- Estimated values
  View of actual measurements with corrections The measurements can be viewed as QAL3, QAL2, Corrected value or Quality assured value. Please note that the function may take time to show data since the raw FLD data need to be calculated before they can be shown. The function can be used to show how the raw value is raised/lowered through the different correction steps

- STA values (30/60 minutes)
  View of the aggregated FLD data as STA values

- LTA values (1 day/1 month)
  View of the aggregated STA values as LTA values

Any view can be exported as a CSV file for further data processing directly from Trend. It is always the chosen components in the chosen timeframe that can be exported.

4.12 Export values

Availability: ReportLoq+: Locally ReportLoq+ Cloud: www.reportloq.com

Data can be exported to CSV files for further data processing from the function "Exported data." ReportLoq can export data at many different calculation stages. FLD data can be exported in all steps found in the CEMS view and the aggregated STA and LTA as intervals, day and monthly values respectively.

No matter what type of export is used, all components for the chosen line are exported with the chosen directive.

4.12.1.1 FLD level: Raw value (logged value), Raw value(calculated), QAL3, QAL2, corrected and quality-assured value

Data exported from these functions are FLD data, typically at 10-second levels. Export is possible for longer periods but care must be taken, as the exported files can become very large for long periods.

Raw (logged value) is an extraction of data directly from the database, whereas the other states will contain calculated components such as NOx, which is calculated on the basis of NO and NO2. ReportLoq does not save the result of this calculation at FLD level, but will instead make the calculation again, if necessary. This means that data export provides a significant number of calculations, even if a decision is made to export the "Raw (calculated value)", since NOx is also exported. The export will thus take a long time when it is for longer periods.

If the "status signal" is included, the exported value will reflect the conditions under which the reading was taken: P=Plant stopped, S=Starting/Stopping, C=Calibrating, M=Malfunction, V=Valid data

If "status bit" is included, the saved 32bit status is exported, which explains in one number the status of the measurement during logging. It is often easier to understand "status", as "status bit" has not been designed for manual reading.

4.12.1.2 STA/LTA level

Aggregated SSTA, VSTA and LTA values can be exported as interval and green values. Interval values are minus the confidence interval. The green value (SSTA) is without subtraction but with replacement of the SSTA values that are not valid or with no more than a week left.

The green value can also be exported as emitted kilo. Only components measured in milligram or Vol% are included in the export.

It is possible to export "status" for both interval and green values.

Interval values are weighted according to: EN = Environmental reporting not relevant; NV = Not Valid; VR = Replacement value; VA = Valid but exceeded; VP = Valid data with secondary replacement

Green values are weighted according to: EN = Environmental reporting not relevant; NV = Not Valid; VR = Replacement value; VP = Valid data with secondary replacement

4.13 Additional lines and directives

If data from several lines are logged at the same time, or if more than one directive is in play for a set of raw values, the directive is shown separately. In this case, the combined screen image will appear, where a quick overview of all the lines can be seen at the same time. If desired, a combined list of alarms/alerts/exceedances can be shown in the combined display picture. In case of several directives and/or lines, the comprehensive view can be divided into several combined views. The set-up can be changed in the administration section of ReportLoq.

Linje 1 (Affald)						Linje 5					
Name	Quality assured value	Valid	30 min. avg.	1 day avg.	Set-point	Quality assured value	Valid	30 min. avg.	1 day avg.	Set-point	Name
Kiln	1	✓	19:40s	12:30m		0	✓	20:30s	12:30m		min.
Filter	1.0	✓	19:40s	12:30m		1	✓	20:40s	12:30m		min.
O2	8.4	✓	7.0	7.0		10.38	✓	1.66	8.10		Vol%
H2O	20.7	✓	20.0	20.0		20.62	✓	20.01	20.00		Vol%
Temp	128.7	✓	128.0	128.0		128.6	✓	128.0	128.0		°C
Press	1,011.1	✓	1,007.3	1,007.0		1,010.7	✓	1,007.1	1,007.0		hPa
SO2	0.0	✓	0.0 A=200.0, B=50.0	0.0 50.0	104.3	0.0	✓	0.0 A=200.0, B=50.0	0.0 50.0	104.3	mg/Nm³
ACC	971.9	✓	939.3	937.0		968.7	✓	937.6	937.0		°C
TOC	1.5	✓	1.5 A=20.0	1.5 10.0	19.3	1.2	✓	0.7 A=20.0, B=10.0	1.0 10.0	19.8	mg/Nm³
CO						5.9	✓	3.3	5.1		mg/Nm³
Hg	4.4	✓	3.1	3.0		674.7	✓	586.9	585.3		µg/Nm³
Dust						0.9	✓	0.5	0.5		mg/Nm³
HCl						1.9	✓	0.7	1.1		mg/Nm³
NOx	162.9	✓	127.3 A=400.0	124.8 200.0	281.7	207.7	✓	48.2	133.5	300.0	mg/Nm³
HF	3.9	✓	3.9 A=4.0	3.9 1.0	0.0	0.8	✓	0.3 A=4.0	0.6 1.0	1.4	mg/Nm³
NH3	1.0	✓	1.0 A=2.0	1.0		1.2	✓	0.7	1.0		mg/Nm³
Flow	115,286.7	✓	119,152.7	118,856.1		168,560	✓	158,186	157,998		Nm³/h
CO2	2.0	✓	2.0	2.0		2.4	✓	1.3	2.0		Vol%
NO	168.7	✓	135.2	133.4		197.9	✓	95.6	150.5		mg/Nm³
NO2	4.4	✓	3.1	3.0		5.0	✓	2.0	3.3		mg/Nm³
Affald	1	✓	00:40s	00:00m							min.
Olie MW						106.7	✓	4,133.3	6,000.3		MW
Biogas MW						300.0	✓	0.0	0.0		MW
Started						Stopped					

Figure 24 – Here you see two lines combined. Note that Line 1 has a light green headline, as the line is active.

Combined display views are suitable for composite displays, ensuring a quick view of the environment reporting.

ReportLoq has been designed to be able to run two directives simultaneously should environmental authorities ever require reporting according to a new directive. This might mean new threshold values, different ways of managing maintenance and many other things. One set of raw values can thus become different STA and LTA values. Should you need to run two report sets for a period of time, you will be able to see the same line in two places. As in Figure 24, the name of the line will be matched to the name of the directive (in this case, Waste).

If several reporting sets are used per line at the same time, reports and screen images will reflect this situation. The construction guarantees that you can always report according to current environmental regulations without replacing the entire reporting system.

In ReportLoq, your raw values are only logged once, no matter how any directives you report according to. As such, directives are derived products based on the same raw measurements. Each directive has its own rules and derived STA/LTA calculations with subsequent exceedances and report sets.

The middle step between the raw measurements and directives is the correction of the raw values. This is done once no matter the number of directives and means that you only need to enter your QAL adjustments one at a time, no matter how many directives are active.

4.14 Dashboard

You can use the Dashboard to tailor a solution to your own control room. You can choose your own colours, fonts, sizes, the components you want shown, and much else besides.

To set up your Dashboard, go to Multiview/Dashboard/Settings in the menu. You can set up more than one if you, for example, have two screens with different views.

The Dashboard you set up will be stored under the path Multiview/Dashboard/[Chosen name]. The Dashboard will be empty to begin with, but you can change this by pressing the "Settings" button. Any changes made will be shown straight away in the menu, which makes it easy to see your settings taking shape. We recommend removing the button from the menu to optimise the view. To display the menu again, use the key combination CTRL + SHIFT + S.

4.14.1 Window

As shown in Figure 25, selected components will be displayed at multiple stages.
The FLD level shows the latest logged measurement, shown either as raw values or as a corrected value. Quality assured values are shown as standard, since these provide the basis for the STA value, and are therefore comparable to the calculated SET-point for that day. As such, you can ensure that the current emission is below the recommended limit and avoid exceedances when displaying the quality assured FLD value. The SET-point with which comparison should be made is the highest figure in the range of FLD.

Linje 4	SO2 mg/Nm³
FLD	0.0 < 110.5
STA minutes	0.0 < 200.0
LTA Day	25.1 < 50.0

Figure 25 - Value display

The STA range shows the current calculations for STA values and for the higher A-limit values. B-limit values cannot be shown on this screen.

The LTA range shows the current calculations for LTA values and for the higher day limit values.

As shown in the figure, STA/LTA calculations are highlighted if they are in the risk zone, i.e. they might exceed the limit values.

There is a small blue pill to the right of the line name. You can change the kiln status by clicking on the arrow/name, e.g. from Stopped to Starting. Please note that the options available for the kiln status will depend on the set-up of your ReportLoq installation.

Exceedances, warnings and alarms for the chosen lines are shown at the bottom of the screen. You can quickly "acknowledge receipt of" everything on the list if you need to. Use the "Acknowledge" button to open the dialogue to acknowledge receipt.

4.15 OTNOC (Other Than Normal Operating Conditions)

ReportLoq's OTNOC function registers and creates OTNOC periods when the plant's combustion is started and stopped. In addition, OTNOC periods can be created manually and included in the reporting.

The OTNOC function is mostly aimed at waste incineration plants, and will not normally be available for other types of plants. However, it can be switched on[17]if other facilities want to focus on emissions during operating conditions that have not been "normal".

OTNOC reporting is about reporting OTNOC periods to the authorising authority. In ReportLoq, this is done in Excel or PDF format. OTNOC reporting, unlike other reporting, is not based on mean values, but is instead a representation of First Level Data (FLD) measured during OTNOC. It is possible to choose whether FLD should be reported as e.g. raw, QAL2, QAL3, or corrected value, and it is also possible to deselect truncation of the values outside the meter's measurement interval, as is otherwise done according to EN 17255-1 during calculation of STA. This makes it possible to see emissions in the full measurement range.

The content of the OTNOC report thus makes it possible to focus on emissions that have occurred during the abnormal operating situation. As a starting point, OTNOC periods do not change the facility's other reporting requirements. Instead, the periods should be understood as focus periods where reporting is required at a detailed level.

4.15.1 Registration of OTNOC

OTNOC periods are automatically registered based on either:

a. Start-up and shutdown signals coming from the control system or manually selected in ReportLoq.

b. ... or via a separate OTNOC signal sent from the control system to ReportLoq. The selected method is shown in the company info under the plant's operating signal. If the OTNOC signal is selected, OTNOC will appear in the signal's validation list and "OTNOC" will be registered as an event when the signal is active.

   The OTNOC signal makes it possible to extend the start-up and shutdown periods to cover "Start-up phase 2" and "Shutdown phase 1" (see **Error! Reference source not found.**) and so that OTNOC p eriods during NOC can be created based on a signal from the control system. Opting for this solution is done in co-operation with Olicem.

[17] Contact Olicem at info@olicem.com if OTNOC is not available on your installation

4.15.2 Editing OTNOC periods

In the 'OTNOC' user interface it is possible to view and edit OTNOC periods, select the components relevant to the periods and enter a comment.

INFO: Automatically created periods are locked in start and end time. If you want to change these, you can instead remove all selected components from the period and manually create a new one that covers the desired period.

Note that default setups can be created with relevant components for each of the created oven lines. New OTNOC periods will be created according to the setup.

4.15.3 Reporting of OTNOC

In the OTNOC function it is possible to pull the detailed OTNOC report. Here, the report can be pulled for the individual period or as a single report for the selected period. The report contains FLD values for the entire OTNOC period and visualises values during operation (R-EOT) differentiated from operation during start-up and shutdown (NR-EOT).

Since the report is based on FLD values, unlike other reports, it may contain a lot of data. It can therefore take a long time to generate.

INFO: It can be an advantage to download the report in Excel format as this, in addition to the visualised values, contains a table with FLD values and is also faster to generate than the PDF file.

In addition to the OTNOC function, the following reports are relevant for OTNOC periods:

- **OTNOC**
  The OTNOC report is the same as in the OTNOC function. If the report is pulled via the report function, it will instead select the reports that relate to the period (day/month/year).
  Note: If the start or end time of OTNOC is within the report's period, the entire OTNOC period will appear. An OTNOC period can therefore appear on multiple reports if it covers a period of several days.

- **The Interval report**
  Here OTNOC is marked on a daily and monthly level with a breakdown of the selected components, allowing you to quickly see which VSTA/LTA values have been affected by OTNOC. Intervals with just one FLD during OTNOC will be highlighted.

- **Start/Stop operating time report**
  For combustion lines that use OTNOC, a breakdown of hours under OTNOC will be shown broken down into NR-EOT (measured values outside relevant operating hours) and R-EOT (measured values within relevant operating hours). The report shows the extent of OTNOC time on the kiln line on a monthly and annual level.

4.15.4 OTNOC Daily limit value

This section is only relevant for facilities that need to replace regular daily limit values with OTNOC daily limit values.

It will appear on the 'Company information' page if the measuring component uses a special daily limit value below OTNOC.

Components that have both "regular" daily limits and OTNOC daily limits automatically switch between the two types of limits when creating OTNOC periods. This means that any exceedances in the period may be affected when creating the OTNOC period, and that VA markings on interval reports on daily and monthly reports may be affected.

For OTNOC below R-EOT (operating time), ReportLoq will warn against exceeding the OTNOC daily value in the CEMS view and the OTNOC daily limit value will be displayed.

Note: Set-points will always reflect the regular limit value (and never OTNOC). This ensures that plants using the set-point for regulation will not suddenly regulate to a higher limit value if an operator mistakenly creates an OTNOC period for the current day.

5 Explanation of calculations

ReportLoq supports two methods of calculation. EN 17255-1:2019 and Classic.

EN 17255-1 follows the calculation methods described in the standard. Support for this standard has been possible from ReportLoq v2.3, which was released in 2020.

Classic was developed before the EN 17255-1 standard was ready and has largely been developed to comply with the Danish MEL-16 recommendation. There are, however, deviations, as ReportLoq and MEL-16 were developed simultaneously.

It is possible to switch from Classic to EN 17255-1,as both methods are based on FLD data, which is logged every 10 seconds. It is recommended that a possible switch be made at the turn of the year, in order to avoid annual reports that contain data from both methods of calculation. If you wish to switch to a different calculation model, please contact Olicem, who will perform the switch.

The method used can be seen on the Company info page - Figure 12 - Company info.

5.1 NOC, OTNOC and EOT – According to IED and waste incineration

In ReportLoq, data is processed based on the plant's operational status and analyser validation. Figure 26 shows the waste incineration plant's operating situations in chronological format. This section describes how these are handled in ReportLoq and how they can be reported.

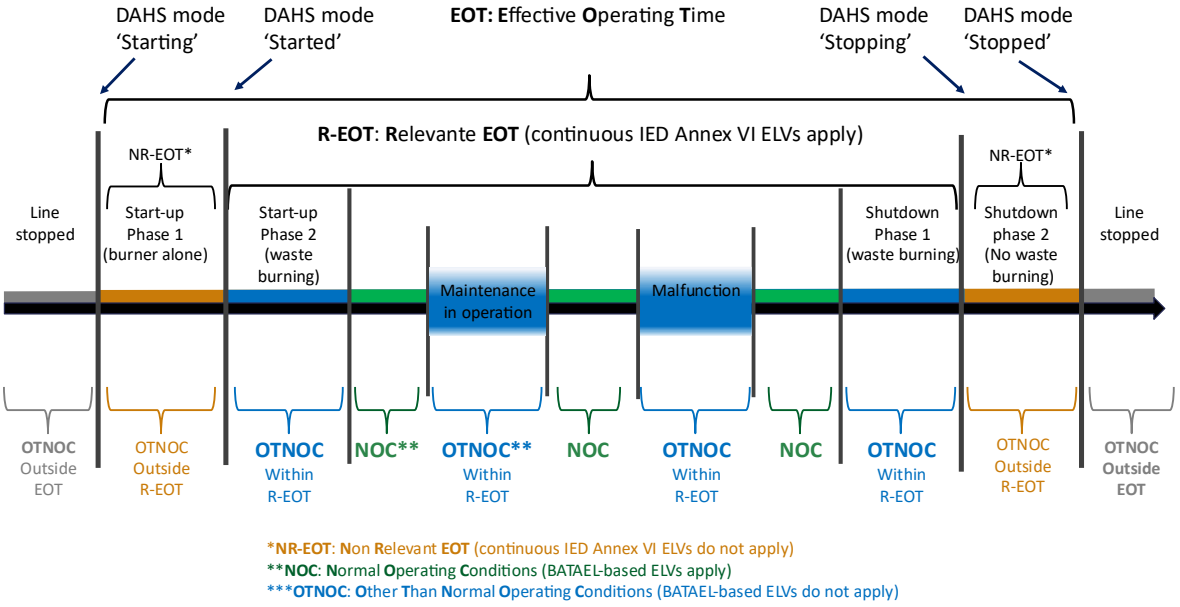


Figure 26 – OTNOC definitions, as given in ESWET/CEWEP report: EXPLANATORY & GUIDANCE document (E&G-d) on IED-based (draft) Waste Incineration BREF and BAT conclusions.

5.1.1 EOT, Effective Operating Time = SSTA / SLTA

Period averages include startup, operation and shutdown. The entire period's data is available in reports containing SSTA / SLTA values. The values are often used for reporting mass emissions and do not contain confidence interval subtraction. The SSTA / SLTA values are not suitable for evaluation against limit values.

5.1.2 R-EOT, Relevant Effective Operating Time = VSTA / VLTA

The periods mean values include only measured data during waste incineration and are available in reports labelled VSTA / VLTA. The reports are suitable for evaluating against limit values and are subtracted confidence intervals if these are specified and active.

Note: If the local authorities do not require reporting of exceedances of BATAEL limit values that are assessed to be made in R-EOT under OTNOC, these exceedances can be annotated in ReportLoq with a comment about OTNOC. The comment will appear in the comment reports.

5.1.3 NOC/OTNOC/NOC - Maintenance and Malfunction (Service and maintenance)

Measurements taken during service and maintenance are excluded from both SSTA/SLTA and VSTA/VLTA averages. When discarding more than the allowed number of measurements (for waste, 2/3 good values are required), the hourly average is discarded. If more than the permitted number of hourly averages are discarded (for waste 5 half hours), the daily calculation is discarded. Rejected days are calculated in several of ReportLoq's reports. Including A-Reports and Exceedance reports.

5.1.4 OTNOC outside EOT

ReportLoq still logs values outside of plant operation, so documentation is also possible in this operating mode. The Trend and Export tools therefore still work in this mode.

VSTA/VLTA reports always discard all values during downtime and the reports therefore show EN = Environmental reporting not relevant.

SSTA/SLTA reports are by default set up to reject values in this operating mode, ensuring that no mass emissions are calculated. However, on special occasions, values can be included in SSTA/SLTA calculations. Whether the value is set to be discarded outside plant operation can be seen under the menu item Company info.

5.2 Method of calculation used

Please see EN17255-1:2019 and MEL-16 for a fuller explanation of calculation models in general.

The following section explains the basic features of calculations for:

- STA = hourly average
- LTA day = daily average
- LTA month = monthly average

Each type of calculation contains a series of descriptive data whose calculation methods depend on the calculation model selected.

5.3 STA

	EN 17255-1:2019	Classic
UTC	Start time of interval as UTC.	
LT	Start time of interval as LT (local time of installation)	
Minutes	Minutes of interval. E.g. 60 or 30.	
Number of measurements	Total number of FLD values measured during interval.	
Valid values used	Number of valid FLD values measured during operation. Can be compared to cut-off values for percentage	
Unit	Unit of the values measured	
Total value	Indicates whether the value is an average or a total	
Cut-off values	Number of valid FLD values cut-off during operation. FLD cut-off occurs only after insertion of cut-off limit.	
Values outside of measurement range	FLD is cut off at a defined cut-off limit and outside the measuring range of the meter	Not detected
Goodness factor	Calculated on the basis of the theoretical number of measurements in the interval. Measurements that are missing or were made during testing, maintenance or meter failures are deducted.	Calculated on the basis of the theoretical number of measurements in the interval. Measurements that are missing or were made during maintenance or meter failures are deducted. It is possible to deselect maintenance for inclusion in the goodness factor account.
The green value (SSTA)	Normalisation of STA value via the STA values of the peripheral parameters. Can be discarded if VSTA-VT is marked EN, depending on set-up. Replaced with highest value one week back if SSTA-VT is NV. Consists of operation time + start/stop	QAL2 FLD is corrected by FLD values of peripheral values. Discarded if SSTA-VT is marked EN. Replaced with highest value one week back when VSTA-VT is NV. Consists of operation time + start/stop
Validation text of the green value (SSTA-VT)	VR • For peripheral parameters when replacement values are used in more than 1/3 of the interval. • For primary parameters marked NV on SSTA-VT. EN If VSTA-VT is EN NV • For primary parameters that fall within the goodness	VR • For peripheral parameters when replacement values are used for one or more FLD value. • For primary parameters marked NV on VT-EM. EN Depending on the set-up, the SSTA-VT can be marked EN on the basis of • stop on the kiln signal

	factor and do not have a valid replacement value • For all parameters without FLD values. VP If one of the peripheral parameters of the component is VR VD Valid intervals, which can be used for kilo calculations.	• if the ACC temperature is low (100 °C or minimum range of meter + 50 °C) VD Valid intervals, which can be used for kilo calculations.
Number of calculated kilos	Calculated kilo value based on SSTA for flow and emission value. Not calculated when SSTA-VT is EN. If the emission value is in VOL%, kilos are calculated on the basis of the molecular weight, which appears under Company info.	
Interval value (VSTA) **After subtraction of confidence interval**	Calculated on the basis of the corrected STA minus the confidence interval. Intervals where VSTA-VT is NV are set to "zero".	SSTA minus confidence interval Intervals where VSTA-VT is NV are set to "zero".
Validation text of interval value (VSTA-VT)	EN VSTA is marked EN if the kiln is stopped 1/3 into the operating time of VSTA VR • For peripheral parameters that have enough replacement values to fail on the goodness factor NV If the interval is empty or falls below the requirement for the goodness factor (generally 66%). VA The interval exceeds the A requirement VP If one of the peripheral parameters of the component is VR VD	EN VSTA is marked EN if an FLD value is outside of normal operation VR • For primary parameters that are dependent on the set-up, the last valid value can be used during maintenance. • For primary parameters during maintenance or failure. Set after use of one replacement value at FLD level. NV If the interval is empty or falls below the requirement for the goodness factor (generally 66%). VA The interval exceeds the A requirement VD

	Valid intervals that can be used to check limit values.	Valid intervals that can be used to check limit values.

5.4 LTA (day)

	EN 17255-1:2019	Classic
UTC	Start time of interval as UTC.	
LT	Start time of interval as LT (local time/start of day for installation).	
Minutes	Minutes of interval. E.g. 1440	
Number of measurements	Number of VSTA values used for the calculation of VLTA.	
Valid values used	Total for the STA value's valid FLD values where VSTA is included in VLTA. Intervals may be rejected when the kiln is out of operation according to the set-up. Can be compared to cut-off values for percentage.	
Unit	Unit of the values measured	
Total value	Indicates whether the value is an average or a total	
Cut-off values	Total for the VSTA value's cut-off FLD values in cases where VSTA is included in VLTA.	
Values outside of measurement range	Total for the VSTA value's FLD values where these are outside the measurement range in cases where VSTA is included in VLTA.	Not calculated
The green value (SLTA)	Average or total value of valid SSTA values.	
Number of calculated kilos	Total kilo value based on STA's kilo calculation.	
Interval value (VSTA) **After subtraction of confidence interval**	Average or total value of valid VSTA values. This will be "zero" in cases where the day has a limit value and VLTA_VT is EN or NV.	
Validation text of interval value (VLTA_VT)	EN If the plant's operating minutes are less than "Active minutes per. day" VR The value is marked VR if more than 1/3 of the LTA consists of STA marked VR NV If the number of VSTA marked NV exceeds "rejected intervals" in the set-up. VA If VLTA exceeds the daily limit value VP If one of the peripheral parameters of the component is VR	EN If the plant's operating minutes are less than "Active minutes per. day" VR The value is not marked VR NV If the number of VSTA marked NV exceeds "rejected intervals" in the set-up. VA If VLTA exceeds the daily limit value VD Valid intervals that can be used to check limit values.

	VD Valid intervals that can be used to check limit values.	

5.5 LTA (month)

	EN 17255-1:2019	Classic
UTC	Start time of interval as UTC.	
LT	Start time of interval as LT (local time/start of month for installation).	
Minutes	Minutes of interval.	
Number of measurements	Number of VSTA values used for the calculation of VLTA.	Number of VSTA day values used for the calculation of VLTA.
Valid values used	Total for the STA value's valid FLD values where VSTA is included in VLTA. Intervals may be rejected when the kiln is out of operation according to the set-up. Can be compared to cut-off values for percentage.	
Unit	Unit of the values measured	
Total value	Indicates whether the value is an average or a total	
Cut-off values	Total for the VSTA value's cut-off FLD values in cases where VSTA is included in the VLTA month	Total for the VLTA day value's cut-off FLD values in cases where the daily VLSTA value is included in the VLTA month.
Values outside of measurement range	Total for the VSTA value's FLD values where these are outside the measurement range in cases where VSTA is included in the VLTA month.	Not calculated
The green value (SLTA)	Average or total value of valid SSTA values.	Average or total value of valid SLTA day values.
Number of calculated kilos	Total kilo value based on STA's kilo calculation.	Total kilo value based on VLTA day kilogram calculation.
Interval value (VSTA) **After subtraction of confidence interval**	Average or total value of valid VSTA values.	Average or total value of valid VLTA day values.
Validation text of interval value (VLTA_VT)	EN The value is not marked EN VR The value is marked VR if more than 1/3 of the LTA consists of STA marked VR NV The value is not marked NV VA If VLTA exceeds the daily limit value	EN The value is not marked EN VR The value is not marked VR NV The value is not marked NV VA If VLTA exceeds the daily limit value VD

	VP If one of the peripheral parameters of the component is VR VD Valid intervals that can be used to check limit values.	Valid intervals that can be used to check limit values.

5.6 Component types used in ReportLoq

There are a number of ways to collect data in ReportLoq

1. Spot data
   Data where each measurement consists of one independent point measurement. Used, i.a., for AMS measurements.

2. Sawtooth
   Often used for consumer meters where the value increases steadily.

3. Bit
   Measurements, which can only be 1 or 0, are often used to measure time. This could, e.g. be a kiln signal

4. Calculations
   Calculations are special in comparison with the other measurements, as they are not logged as an independent measurement. Their value consists of other measurements and is calculated on a constant basis. One example is NOx, which is often measured using NO and NO2 via the formula NOx = 1.53 * NO + NO2. NO and NO2 are measured as spot values and NOx is calculated from these. This means that calculated components are not stored as FLD values, but instead are calculated via a formula.

Please note that FLD data can be exported to CSV files for all four types. It will take extra time if calculations are included in the export however, as data will be calculated in parallel with the export.

5.7 Logged values

All component types logged in ReportLoq are saved in the following format:

Type	Description
UTC	UTC time for logged value
Value	Value between 0 and 999,999,999.999
Status	32 bit value
Status text	Total of status bit
Component ID	Descriptive ID of the logged component
Line ID	ID for the Line to which the component belongs

The status value for 32 bit is divided into the following bits:

Bit	Description	Bit		Bit		Bit	
0	Reporting active	**8**	Instrument error	**16**	Manual low priority active	**24**	Available
1	Reporting stopped	**9**	Instrument error	**17**	Manual error active	**25**	Available
2	Reporting during start-up	**10**	Instrument error	**18**	Manual maintenance active	**26**	Available
3	Reporting during shut-down	**11**	Signal in test mode	**19**	Available	**27**	Available
4	Reserved	**12**	Instrument calibrating	**20**	Active signal is under SCADA control	**28**	Available
5	Instrument error	**13**	Reserved	**21**	Wirebreak	**29**	Available
6	Instrument error	**14**	Reserved	**22**	Reserved	**30**	Available
7	Instrument error	**15**	Reserved	**23**	Reserved	**31**	Available

The status text is a visual representation of status bits, which are prioritized in the following order:

Priority	Value	Bits	The value is measured during…
1	T	High = 11	Test, cannot be used for reporting
2	P	Low = 0	During stoppage
3	S	High = 1.2	During start-up or shut-down
4	C	High = 12.18	During maintenence of meter
5	M	High = 5,6,7,8,9,10,17,21	During meter error
6	V	Low = 5,6,7,8,9,10,12,17,18,21,11 High = 0	
7	?		Circumstances other than the other priorities

Tip: It is possible to view bits and validation texts by accessing the CEMS screen on the local ReportLoq server and then correcting the URL; the word "index" should be replaced by "test".
*Example: "/line/**index**.xhtml?id… is changed to /line/**test**.xhtml?id…*

5.8 Values measured during testing

It is possible to mark the measurements with "Test" during reconfiguration or operation. This can be done in the PLC program or via ReportLoq's local user interface. Both of the above are locked and may only be used by technicians.

Values measured during testing will be interpreted as "invalid" by ReportLoq and count towards invalidating the day. The active signal during testing will, however, simulate stoppage. This functionality means that ReportLoq can be operated for several days with test bits set at all measuring points without the plant starting the environmental reporting up with rejected days.

In cases where analysers are continuously replaced and where only the analyser signal is placed in test mode, the relevant measurements may give rise to rejected days if the test takes place over longer periods.

NB: Values logged during testing will be displayed on the CEMS screen as valid values and marked by a green tick. This is so that the other status bits can be tested during operation. The values will not, however, be included in mean values, which means they will not be part of the reporting to the authority.

5.9 Method of calculation used for "Calculated components"

The following categories and calculations are available in ReportLoq.

1. Calculations of averages
   This method of calculation can be used to take an average of values from several analysers.
   Please note that this function varies in EN 17255-1 and Classic.
   a. EN 17255-1: SSTA values are used to calculate averages
   b. Classic: FLD values are used to calculate averages

2. Prioritised measurements
   Select the best measurement for the result. The measurement with the highest priority is used if both measurements are valid. The function is often used in set-ups with parallel AMS meters where it is desired to reduce downtime by outtime on one of the meters.

3. Formulas
   When using formula-based measurements, FLD values from other components are used as input.

   FLD from input parameters at QAL3 level is used in the formula and corrected using the QAL2 value from the calculated component. The mode of operation becomes available as QAL3 is often carried out on FLD input values, while the QAL2 report only contains the QAL2 corrections of the calculated component.
   It is therefore necessary to form the STA of the calculated component from the FLD values of the input parameters in order to be able to apply the QAL2 value from the calculated component. The SSTA value for formulas varies in EN 17255-1 and Classic.

   a. EN 17255-1: SSTA becomes available when normalisation is performed at SSTA level, as described in the standard.
   b. Classic: SSTA becomes available when normalisation is performed at FLD level.

   Please note: it is important in both cases that all input parameters have the same normalisation factor and that correction is applied to the calculated component.

5.10 Calculation of mass emissions

In order to calculate mass emissions, flow must be measured in addition to the emission value.
Please note that this function varies in EN 17255-1 and Classic.

- EN 17255-1: Mass emissions are calculated in accordance with EN17255-1: 2019 (8.14)
- Classic: Mass emissions are only calculated for active periods

5.10.1 EN 17255-1

The period for the calculation of mass emissions may vary depending on the method chosen.

5.10.1.1 Method 1: Always calculated.

Mass emissions are calculated irrespective of kiln status.

5.10.1.2 Method 2: Periods with kiln operation, start-up and shutdown.

The active signal is included in the calculation to know/weight how large a part of the STA period emissions should be reported. The green value of the kiln signal includes start-up and shutdown, in addition to the active period.

Mass emissions will always be calculated during kiln operation, start-up and shutdown. The calculation will not be affected by any shifts between the three different types of operation.

5.10.2 Classic

The period for the calculation of mass emissions may vary depending on the method chosen.

5.10.2.1 Method 1: Always calculated.

Mass emissions are calculated irrespective of kiln status.

5.10.2.2 Method 2: Periods with kiln operation, start-up and shut-down.

Mass emissions are only calculated during kiln operation, start-up, and shutdown. Mass emissions are not calculated for SSTA periods with one FLD value when a kiln is stopped.

5.10.2.3 Method 3: According to ACC temperature.

Mass emissions are calculated in all periods where the ACC temperature is greater than a minimum range of + 50 °C.

A safety margin of 50 °C has been adopted to ensure a good indication that the ACC temperature is low.

5.10.3 Replacement of invalid periods

Periods in which measurements are not 2/3 valid are automatically replaced by the highest valid value measured one week back during kiln operation. Values that are rejected during kiln operation are not replaced.

5.11 Cut-off

Common description for EN 17255-1 and Classic:
The following applies to AMS in cases of both digital and analogue data transfer respectively:

- Cut-off time based on FLD may not exceed 2% of the total operation time per calendar month.
- The cut-off level must be raised if the 2% rule is exceeded.

When cut-off is used it will also apply to mass emissions [kg].

5.11.1 Only EN 17255-1

Measurement values that exceed the measurement interval are factored in mean values as the value for the peak of the measurement interval (this applies to both digital and analogue signals). The cut-off level is therefore below the measuring interval when cut-of is referred to in EN 17255-1. There is no cut-off when the cut-off level and measuring interval are identical.

Calculated components that are calculated from one or more sub-components (such as NO_x that can be calculated from NO and NO2) are printed as a cut-off on the calculated component (NO_x).

6 Glossary

	Explanation:
AMS	Automatic Measuring System. Measuring system, which is included in and operated by the system and used for environmental reporting.
DAHS	Data Acquisition and Handling System Refers to the environmental reporting system, which in this case is ReportLoq, and the hardware used for it.
ELV	Emission Limit Value
EOT	Effective Operating Time
FLD	First Level Data The logged data. In ReportLoq, data are logged at regular intervals: Can be set between 10 and 60 seconds in each case. For emission reporting, logging every 10 seconds is required.
LTA	Long Term Average Average values for one day or more. Is in ReportLoq for one day or one month.
NR-EOT	Not Relevant Effective Operating time
NOC	Normal Operating Conditions
OTNOC	Other Than Normal Operating Conditions
R-EOT	Relevant Effective Operating Time
SRM / Parallel measurements	Measurements are performed parallel with AMS. Parallel measurements are performed by an accredited measurement company in accordance with standardised reference methods (SRM).
STA	Short Term Average Average values between 1 and 60 minutes. Calculated in ReportLoq during operation, start-up and shutdown.
SLTA	Standardized Long Term Average LTA value calculated from SSTA values.
SSTA	Standardized Short Term Average STA value at reference condition. Is calculated in ReportLoq during operation as well as during start-up and shutdown. Used to calculate mass emissions.
VLTA	Validated Long Term Average LTA value calculated from VSTA values.
VSTA	Validated Short Term Average SSTA value minus confidence interval. Is calculated in ReportLoq during operation. Used for comparison with environmental conditions.

σ_0 (sigma zero)	σ_0 = quality requirement divided by 1.96. Regardless of whether σ_0 is indicated as a percentage of the limit value or as an absolute value, $_0$ is approx. half of the quality requirement.
A limit value	STA limit value that must be complied with 100%
B limit value	STA limit value that typically must be complied with 95/97% of the time on an annual basis

7 Contact information

Olicem A/S
Majsmarken 1
DK-9500 Hobro · Denmark
Main e-mail: info@olicem.com
VAT-ID: DK 3995 8708
www.olicem.com

8 Document revision

Rev.	Date	Author	Description
1.0	9 Dec 2014	KVIN	Created
1.1	9 Jun 2015	KVIN	Updated according to version 1.15
1.2	30 Jun 2016	KVIN	Updated according to version 1.16
1.3	5 Dec 2016	KVIN	Updated according to version 1.17
1.4	1 Apr 2018	KVIN	Updated according to version 1.18
2.0	1 Aug 2018	KVIN	Updated according to version 2.0
2.1	1 Jan 2019	KVIN	Updated according to version 2.1
2.2	1 Jun 2019	KVIN	Updated according to version 2.2
2.3	1 Oct 2020	KVIN	Updated according to version 2.3
2.4	1 July 2023	KVIN	Updated according to version 2.4 (ReportLoq version 2023.2.14)
2.5	10 Nov 2023	KVIN	Updated according to version 2.5 (ReportLoq version 2023.2.15)
2.6	6 Sep 2024	KVIN	Updated according to version 2.6 (ReportLoq version 2024.2.16)
2.7	27 Feb 2025	KVIN	Updated according to version 2.7 (ReportLoq version 2025.2.18)
2.8	13 Oct 2025	KVIN	Updated according to version 2.8 (ReportLoq version 2025.2.21)