STOREX
CONTROLLED ATMOSPHERE

PROJECT PROPOSAL

2025

Name organisation:
Fruit
Date: 12th of November 2025
Number: 255096

Storex B.V.
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Fruit Warehouse
Lassipora
Kashmir

Date: : Hendrik Ido Ambacht 12th of November 2025
Quotation : Offer for CA technics for 20CA rooms
Our reference : 255096-Fruit 20 x CA V1

Dear mr. Sirs,

Thank you very much for your inquiry. Enclosed, please find our quotation for supplying Storex CA equipment and accessories. Our offer is based on the information provided in your request. We are pleased to present the following details in our quotation:

1. Project details
2. Storex CA technology
3. Summary of offered Products and Prices & Delivery conditions.

The primary goal of Storex is to provide the most advanced and suitable (D)CA technology for the best fruit quality after storage. With our products, you can count on the availability of all the necessary functions for the effective and energy-efficient control of the desired CA climate, a long service life, reliability and user-friendly operation. Our (D)CA system has extensive remote control capabilities and essential service functions that ensure ease of operation, insight into data about the operation of the CA control and assurance for proper operation.

Should you have any questions regarding the quotation or require further information, please do not hesitate to contact me. We would be honored to serve you with our products and services and are fully committed to meeting your needs with the utmost professionalism.

With kind regards,

STOREX BV

Peter Kooijman

Mobile: +31 6 53230036
E-Mail: p.kooijman@storex.nl

Index Quotation

1 PROJECT DETAILS

The primary goal of fruit storage is
to ensure optimal fruit quality after the storage period.

Storex is pleased to offer an effective CA installation

Our offer is based on your inquiry:

No. CA rooms	20 (in total 20)
Dimensions per room	1000m³
Contents in tons	250 Tons
Total nr. of tons	Ca. 5.000 Tons
Stored products	Apples
Located at	Lassipora

Below is our definition of the starting point for creating the price proposal. Please note that the project price may vary, based on the final design decisions. We include all necessary components for the installation. However, in the final stage, in collaboration with the installation company, modifications can be made to the scope of deliveries, such as the inclusion or exclusion of PVC materials.

The CO_2 Scrubber

The required total CO_2 scrub capacity is depending on following factors:

- The varieties of fruits being stored
- The CA storage recommendations for O_2 and CO_2
- Storing fruit at low CO_2 levels will require much more CO_2 scrub capacity compared to storing at a high CO_2 level!
- The storage capacity per room, the number of CA rooms and the total capacity. Possible expansion plans?
- If DCA / DCS will be used. When apples are stored at a lower O_2% it is possible that the CO_2% is also decreased. This requires extra capacity.
- In case MCP-1 is applied it appears that the recommendation is to store apples at a lower CO_2%
- The CO_2 production may vary per year. It is common practise to offer extra CO_2 scrub capacity for this reason.

CO_2 % in CA room	Tonnage	CO_2 scrub capacity in kg	Needed CO_2 scrub capacity
CO2 scrub capacity is in kg CO2 per 100 Ton per 24 hours at a reference value of 3% CO_2			
2%	0	15	0
1,50%	2500	20	500
1%	2500	30	750
0,80%	0	35	0
0,60%	0	42	0
	2500	**1x 100 Tons**	
Total needed scrub capacity based on this assumption			**1250**

Our offer **2 x ST700 scrubber for 30 CA rooms**			**1400**
Available average scrubcapacity			**28kg/100tons**

Offer CO_2 scrubber

Based on the calculations as made above **we offer 2x type ST700 and with an extra price 2x type ST850** with respectively scrub capacity of 700 and 850 kg CO_2/24 hours.

The needed CO_2 scrub capacity can vary considerable from ca. 15 – 40 kg. CO_2/100ton/24hour depending on the type of variety and CA conditions under which the fruit is stored

We enclose a table of an example of CO2 levels advised in some area is Europe when applying DCA low levels of oxygen in the DCA rooms.

Table with CO2 levels corresponding with O2 level

%CO_2 / %O_2	Gala	Stark	Granny Morgenduft, Winesap	Golden Jonagold	Braeburn Fuji	'Pink Lady'
0,4	1,2	0,9	0,9	0,9	0,6	0,6
0,5	1,3	0,9	1	1	0,7	0,7
0,6	1,4	1	1	1,1	0,7	0,7
0,7	1,6	1	1	1,2	0,8	0,8
0,8	1,8	1	1	1,4	0,8	0,8
0,9	2	1	1	1,6	0,9	0,9
1	2	1	1	1,8	1	1

The N_2 Generator

For the selection of the capacity of the N_2 generator the following factors are relevant:

- Contents and no. of CA Rooms
- Preferences and strategy of Pull Down
- The choice for extra capacity for controlling low O2% for DCA/DCS
- Presence of no. of leaky rooms
- Is recirculation of room air to the N2 generator applied yes or no.

Tons per Room	Volume in m3/room	Pull down from 21% --> 5%	Pull down from 5 % --> 1,5%	Pull down from 21% --> 1,5%
VSA N2 Generator 2x Type 50 direct injection = **100 m3 in total**				
250 Ton	1000	27,1	27,1	54,2
VSA N2 Generator 1x Type 70 direct injection = **130 m3 in total**				
250 Ton	1000	21,7	21,7	43,4

*Pull down from 21% --> 5% and from 5% --> 1,5%, **Without** Product activity estimated In hours.*

Offer N_2 generator

Based on the calculations as made above **we offer our VSA N2 generator, 1 pcs Type 40 and 1pcs. Type 50** Pull down capacity as indicated above.

Requirement on gas tightness of CA stores
For CA storage it is important that the gas tightness of the CA rooms meets with the minimum conditions of required gas tightness described as follows:

System of testing	Regular CA (Set point of 1% O_2 or above)	DCA (Set point of 1% O_2 or less)
Pressure test	Pressured drop in 10 minutes max. from 80Pa to < 50Pa.	Pressured drop in 10 minutes max. from 80Pa to < 60Pa
Flow test	< 0,2cm² leak opening/100m³	< 0,1cm² leak opening/100m³

These standards are according to the regulation of the FBR institute of the WUR Wageningen.
Storex is also offering services and products for testing the gas tightness of CA rooms.

The following chapter is describing the selected products and services and its main characteristics.
In case of questions about the technology of CA storage of fruits we will be pleased to answer your questions.

3 x ST1000 + VSA Type 60 + CMS system for 30 x 200 CA rooms for pears.

2 STOREX CO2 SCRUBBERS

2.1 CO_2 scrubber

Storex CO2 scrubbers are equipped with highly efficient active carbon filters designed to effectively remove CO2 generated by stored fruit in connected Controlled Atmosphere (CA) rooms.

The CO2 scrubber unit features two vessels filled with active carbon, supported by a robust frame that houses the valve section, frequency-controlled ventilators, and a control box. The control box is equipped with an integrated O2/CO2 analyzer and the Autostore MaC (Measurement & Control system). The scrubber connects to CA rooms via a PVC piping system and dedicated room valves.

Main Advantages of Storex Scrubbers for best fruit quality:

- Minimal heat and oxygen input into the CA room, reducing the need for N2 supply.
- Lower dehydration levels, resulting in minimal weight loss of stored fruit.
- Precise control of O2/CO2 settings with minimal CO2 fluctuations.
- Remote control of all functions via the Storex App for convenience.
- Maximum utilization of scrub capacity always.
- User-friendly, safe, and reliable operation.
- Ready for Dynamic Controlled Atmosphere (DCA) applications.

Important features of the Storex CO_2 scrubber are:

- Autostore MaC provide complete and intelligent useful functions based on 50 years experience in CA control.
- *Auto diagnostic system* for control of the lowest input of oxygen to CA room.
  Each CO2 scrubber has an integrated O2/CO2 analyser for enabling this.
- The number of scrub actions is minimized because of Auto diagnostic system.
- Sufficient air circulation and the right needed weight of active carbon guarantee the indicated scrub capacity in Kg CO_2/100 ton of your CO_2 scrubber. Based on:
  - Large diameter scrubber valves for low resistance / energy use.
  - Highly efficient, frequency controlled direct drive fans.
  - We apply a proven standard of at least 2kg. Active Carbon / Kg CO_2 scrub capacity.
- Smart design: easy to maintain, all parts are easily accessible.
- All these features make Storex CO_2 scrubbers excellent in performance and being used by the largest fruit warehouse throughout the world.
- Our CO2 scrubber is also removing ethylene.
-

Storex CO_2 scrubber type ST 700	
Technical details:	200-010-0370
CO_2 adsorption capacity per 24 hr. at 3% CO_2	700 kg.
Central Switchboard	Integrated Autostore MaC system for all functionalities for the operation of the CO2 scrubber and the control of the CA climate in the connected rooms.

	Provided with integrated O2/CO2 analyzer and Auto diagnostic system for automatic calibration perfect working of the of low oxygen content system
Working principles	2 Vessel system; Low oxygen content working principle in which a so-called scrubber lung is not required.
Required air flow	700m³/hour (note single vessel scrubber requires double capacity flow of 1400m³/hour + required large size piping+ valves)
Quantity of active carbon	1.400 kg.
Diameter pipes and valves in scrubber unit	125 mm
Diam. PVC pipes between scrubber unit and cold store	125 mm /160mm
Ventilators	Dietz HR 090- E80 113 Hz 3,0 kW
Electric power installed	2x 3 kW, in total 6 Kw, 8,05Hp. 380 V, 3phase, 50Hz.
Power consumption	< 7 kW
Fuses	16 Amp.
Sizes valve section	110 x 150 x 180 (wxdxh) cm
Sizes vessel set	2x vessel Ø124; 260 x 130x205 (diam. xh) cm
Total Weight	2.400 kg.

Storex CO_2 scrubber type ST 850	
Technical details:	200-010-0307
CO_2 adsorption capacity per 24 hr. at 3% CO_2	850 kg.
Central Switchboard	Integrated Autostore MaC system for all functionalities for the operation of the CO2 scrubber and the control of the CA climate in the connected rooms. Provided with integrated O2/CO2 analyzer and Auto diagnostic system for automatic calibration perfect working of the of low oxygen content system
Working principles	2 Vessel system; Low oxygen content working principle in which a so-called scrubber lung is not required.
Required air flow	850m³/hour (note single vessel scrubber requires double capacity flow of 1700m³/hour + required large size piping+ valves)
Quantity of active carbon	1.700 kg.
Diameter pipes and valves in scrubber unit	125 mm
Diam. PVC pipes between scrubber unit and cold store	125 mm /160mm
Ventilators	Dietz HR 090- E80 113 Hz 3,0 kW
Electric power installed	2x 3 kW, in total 6 Kw, 8,05Hp. 380 V, 3phase, 50Hz.
Power consumption	< 7 kW
Fuses	16 Amp.
Sizes valve section	110 x 150 x 180 (wxdxh) cm
Sizes vessel set	2x vessel Ø130; 260 x 130x205 (diam. xh) cm
Total Weight	2.700 kg.

2.2 Room valves and PVC piping

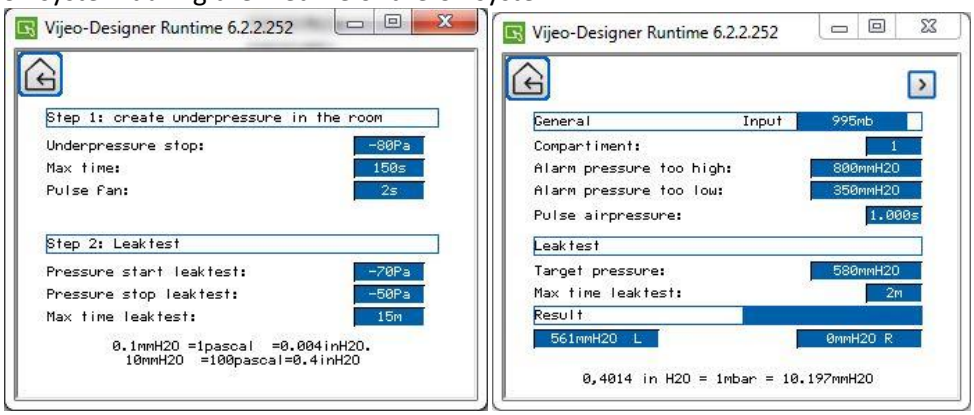
We deliver and install a **Central supply and return PVC piping system** which connects the scrubber to the CA rooms with a diameter of 160 mm.
A sufficient sized diameter PVC piping minimizes warming up of the circulated room air.

Each CA room is connected to 2 pcs room valves with a diameter of **125 mm**. The design of the disc plate room valves provides a large free space for allowing maximum air flow. The construction and its working principle provide a rigged and reliable operation.

These valves are controlled by an electric pneumatic 4/2 valve and connected by electrical cable and compressed-air supply. The central supply and return PVC piping system is combined with an extra aeration fan for each CA room.

2.3 Pressure testing of CO2 scrubber valve section and piping and room valves

Pressure sensor + valve for measuring the gas tightness of the scrubber + piping system.
This function can be performed by remote control. This feature is useful for checking the good working of the CA system during the lifetime of the CA system.



3 AUTOSTORE MEASUREMENT AND CONTROL (AUTOSTORE MAC) SYSTEM

3.1 Autostore Measurement and Control (Autostore MaC) system

Autostore Measurement and Control (Autostore MaC) system for the operation of the CO2 scrubber and the CA climate in the connected CA rooms is standard built up as follows:

- Touchscreen + PLC + input / output cards + software for measuring and controlling the CO2 scrubber and the CA climate in the connected rooms and attached components.
- Integrated O2/CO2 analyser (see below).
- Measuring valve in the switch box for measuring the O2/CO2 in the CA rooms during scrubbing.
- Measuring valves in the switch box for the Auto diagnostic system.
- Pressure sensor + valve for measuring the gas tightness of the scrubber + piping system.
    - Aeration on High CO2; during cooling down and waiting period,
    - Automatic CA control: working of the CO2 scrubber and N2 injection are controlled
    - Power air out: Automatic aeration of the CA room before opening
- In case a N2 generator is connected to the CA system: O2 measurement of the purity of the produced nitrogen

- A router for connection of VPN/Internet (in case an App or ADM will be installed)

	The Autostore MaC control system provide for each room the choice out of 4 status:
Status 1:	**Off**
Status 2:	**2. Auto (D)CA** The Auto (D)CA system equipped with Storex CO2 scrubbers automates the measurement and control of O2 and CO2 levels in Controlled Atmosphere (CA) rooms. It includes essential features like auto-tuning for optimizing the scrubber's performance, valve alarms to detect leaks, and various control mechanisms for adjusting scrub actions, nitrogen injection, and aeration per room. The system also provides detailed monitoring and display of key parameters, including gas levels, scrub times, and alerts for maintenance needs. Additionally, it offers advanced options such as ethylene measurement, DCS ethanol protocols, and pressure testing to ensure optimal CA storage conditions.
Status 3	**3. Status: High CO2 aeration** High CO2 Aeration: During the start of the CA system, it is desired to measure the O2/CO2 value in a CA room. In case the measured CO2 values is exceeding threshold values the CA room has to be aerated with ambient air. This can be realized by activating an aeration action by the scrubber or by activating and extra installed aeration ventilator per CA room
Status 4	**4. Status: Power Aeration** In case after a CA storage, it is desired to install ambient atmosphere conditions in this CA room of 21% Oxygen and 0,03% CO2 it is possible program status Power aeration for this room. The aeration of the CA room is performed via the 2 scrubber ventilators on maximum speed. 1 ventilator will extract the room air and the other ventilator will insert ambient air. Thanks to the presence of 2 scrubber fans this is possible in a very fast way causing minimum pressure difference in the CA room.

3.2 S-measuring via the scrubber

Through a separate PU hose the rooms are measured independently from the scrubber. The switch box of the scrubber will be equipped with 10 extra measurement valves.
The program of the scrubber will control extra measurement actions. The O2/CO2 will be measured during a scrub action and also separately via the extra installed PU hoses.
This system is needed in cases there is a larger nr. As ca. 7-9 rooms connected to a scrubber and when the atmosphere of CA rooms vary strongly.

S-measurement - extra measurement valves integrated

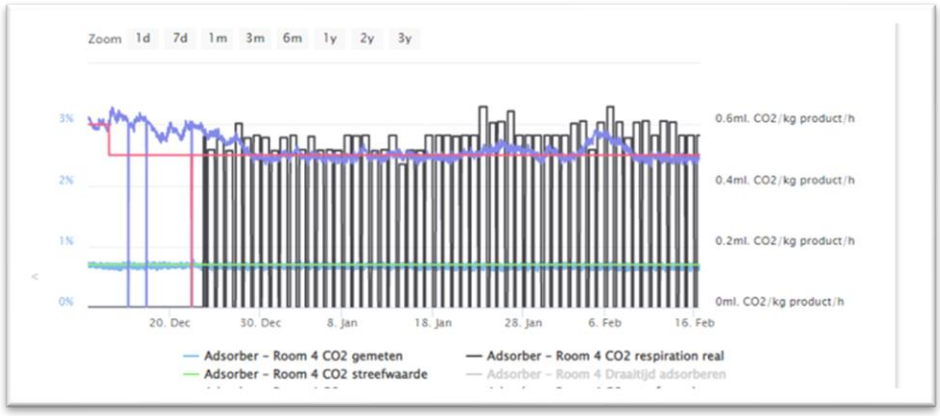
3.3 CO2 respiration measurement per room

The controll system of the CO_2 scrubber is standard equipped with a system for measuring the rate of CO2 respiration by the product stored in the CA room
The respiration rate is expressed in Kg. CO_2/24hours/100Ton.
The display of the respiration rate provides the possibility to follow the trend of the respiration rate during the storage season.

It is also possible to compare the respiration rate of different rooms and to check per exampe the effectivity of a MCP-1 treatment or the effect of the programmed storage conditions.
The CO2 respiration is determined by keeping precisely track of the exact amount of CO2 removed by the CO2 scrubber and to relate this to the quantity of product stored in that CA room.

The CO2 respiration measurement is a product that is developed by Storex in 2020.

In the tables below you find 2 graphs as an example of CO2 respiration in the CA rooms



Temp.	-1,1C	Increase in temp. 19 januari -1,0C	Increase 3 april-0,9C
ml. CO2/kg/uur	0,51	0,57	0,62
Difference Extra running hours scrubber		0,06	0,05 +9%

4 ANALYZERS

4.1 Built in O2/CO2 analyzer

Built in O2/CO2 analyzer placed in switchboard of CO2 scrubber	
Components	: Suction pump + flow meter
Operation system	: Via Autostore MaC and operation via touchscreen
Flow rate	: 0,3 L/Minute
Power	: By electric system of scrubber/ switchboard 220V.
Calibration	: Automatic and manual mode. Electric valves are provided for 2 calibration gases
Output	: 4-20 mA / 0-20 mA / Modbus
O_2 sensor	: Chemical cell
Range	: 0-25%
Accuracy 0-3%	: 0,01% O_2
Accuracy 3-25%	: 0,1 % O_2
Lifespan of cell	: 2 years with regular use.
CO_2 sensor	: Carbocap CO_2 meter type GMP 251
Range	: 0-20% CO_2
Compensation	: Pressure and Temperature compensation integrated Compensation for background gases Head of sensor is heated for prevention of condensation
Temperature range	: -40 – +60 °C
Housing	: IP65

Built in O2/CO2 analyser with optional NH3 sensor

4.2 Portable O2/CO2 analyzer

The Storex portable O_2/CO_2 analyzer is developed by Storex with leading engineers for manufacturing O_2/CO_2 analyzers. Special features dedicated for the CA storage of fruit are integrated.

Main features:

- Large display, illuminated.
- Life time indicator for oxygen sensor.
- Infrared Carbocap technology for the CO2 sensor.
- Flow and battery indicator.
- Modbus and mA Analog communication.
- Lithium-Ion battery pack rechargeable
- Easy to operate and to calibrate.
- Extra memory for data storage.
- Can be used as back up O2/CO2 analyzer for scrubber switchboard.
- Technical details of O2/CO2 analyzer similar as in the integrated O2/CO2 analyzer.

Portable O_2/CO_2 analyzer

Technical details:	
Housing	: Aluminum housing with large display 3,5” (74mm x 50mm WxH)
Components	: Pump, flow sensor, operation program, inlet/outlet for gas
Attachments	: Belt, tube + filter and handle for carrying
Flow rate	: 0,3 L/Minute
Voltage	: 24VDC
Battery	: Rechargeable Lithium-Ion battery pack

Memory	: For portable use the analyzer can save the measured data

4.3 Calibration gas bottle + Manometer + Pressure reducer + flow meter

For manual and automatic calibration of the O_2/CO_2 analyzer we provide a bottle with calibration gas. The manual calibration is done manully by opening the handvalve and following the procedure. The calibration with ambient air is done automatically.

Specifications:	
O_2/CO_2%	: 0,0% O_2 + 2% CO_2 according to value on calibration certificate
Volume	: 10 liter
Pressure	: 200 bar
Accessories	: Manometer + Pressure reducer + flow meter

4.4 Calibration gas bottle with automatic flow control (option)

For automatic calibration of the O_2/CO_2 analyzer we provide a bottle with an valve with automatic calibration gas. The calibration on calibration gas is done automatically by opening the valve and proceeding the calibration. The calibration with ambient air is done subsequently automatically.

Specificaties:	
O_2/CO_2%	: 0,0% O_2 + 3% CO_2 volgens waarde op kalibratiecertificaat
Volume	: 10 liter
Druk	150 bar
Accessoires	: valve with automatic flowcontrol

4.5 MGA O2/CO2/Ethylene dual range / (Optional NH3 analyzer)

The Storex MGA portable O_2/CO_2 /Ethylene Dual range analyzer is developed by Storex. Special features dedicated for the CA storage of fruit are integrated.

Main features:

- Large display, illuminated.
- Life time indicator for oxygen sensor.
- Infrared Carbocap technology for the CO2 sensor.
- Flow and battery indicator.
- Modbus and mA Analog communication.
- Lithium-Ion battery pack rechargeable.
- Easy to operate and to calibrate.
- Can be used as back up O2/CO2 analyzer for scrubber switchboard.
- Technical details of O2/CO2 analyzer similar as in the integrated O2/CO2 analyzer.

MGA analyser

Storex developed the MGA analyser with build in ethylene analyser based on:

- 2 ethylene sensors being build in:
  - 1 sensor with a range of 0-20 ppm ethylene
  - 1 sensor with a range of 0-200 ppm ethylene
- Smart control system for automatic switching to the appropriate sensor depending on the ethylene level in the CA room.
- The building in Double Smart ethylene analyzer is very suitable for DCA rooms.
- NH3 analyzer in accuracy range 0-200ppm. Other ranges available on request.

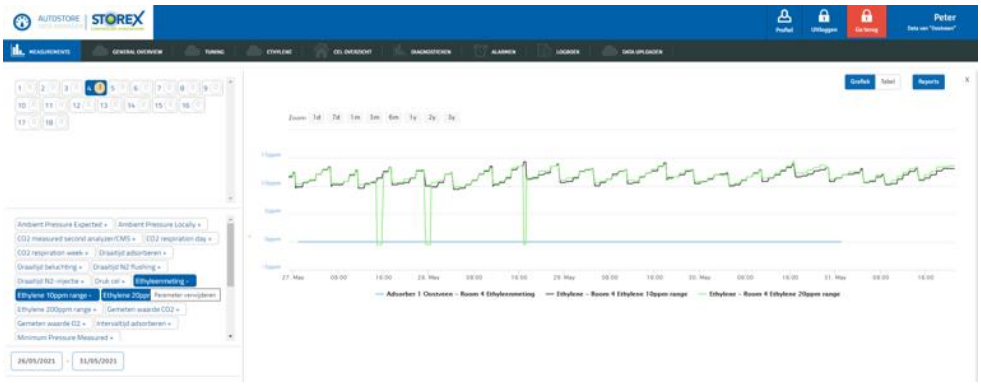
Technical details:	
Housing	: Aluminum housing with large display
Components	: Pump, flow sensor, operation program, inlet/outlet for gas
Attachments	: Belt, tube + filter and handle for carrying
Flow rate	: 0,3 L/Minute
Voltage	: 24VDC
Battery	: Rechargeable Lithium-Ion battery pack

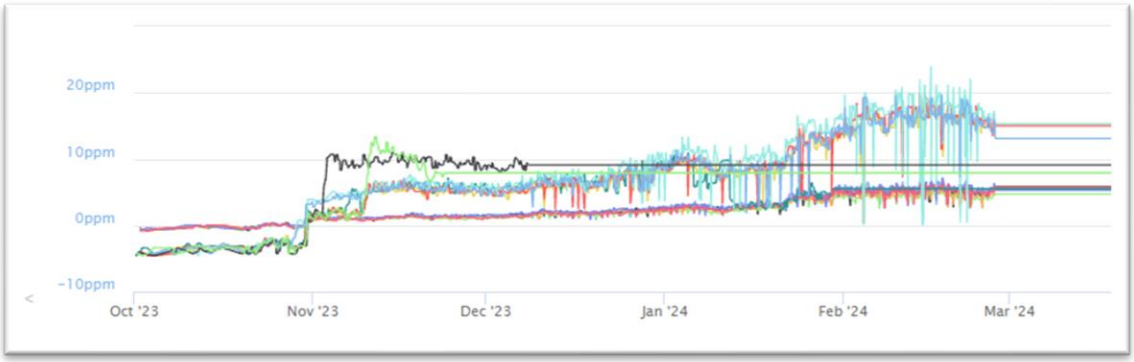
Applications

- Measuring the Ethylene level in a DCA room for checking the effect of a MCP-1 application.
- Following the trend of ethylene production during the storage season. An increase of ethylene can be an indicator for aging of the product.

Accuracy:	Sensor 0-200 ppm >1 ppm** *Tested in various warehouse for various products. ** Depending on the ethylene level in the DCA room. sensor 0-20 ppm 0,4-1 ppm*

Graph with ethylene readings. It is clearly visible that due to CO2 scrub actions, ethylene is being removed.





Figuur 1 Conference pears; Ethylene in 2 rooms without 1-MCP (10 ppm from the start), a group of rooms with 1-MCP and black spot quality issues (up to 17-20 ppm) and a group of rooms with conference pears with 1-MCP without quality issues (slow increase 2-5 ppm

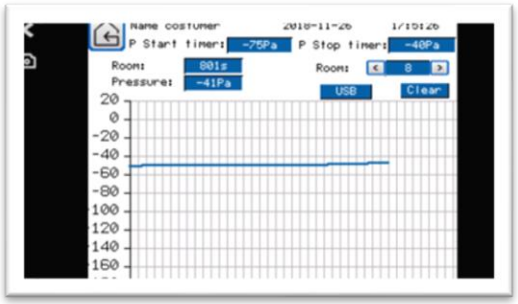
4.6 Portable pressure sensor for CA rooms option not included

The system consists of a CAN module with 2 pressure sensors. The pressure sensors must be connected with a 6/4mm tube with the atmosphere of a CA room. The CAN module is connected by a CAT5 cable with the Autostore MAC system for reading the data. This is useful for:

- Following pressure changes in a CA room, p.e. because of cooling actions,
- Carrying out a leak test in a CA room
- To follow atmospheric pressure changes in a CA room. With increasing pressure outside air of more than 1 mbar per hour the N2-generator is started to inject nitrogen into all cold stores. This Barometric system is an important feature to coop with strong atmospheric pressure changes.

The pressure reading is stored in the ADM system and available in an advance graph program.

Pressure reading in CA room in a graph



Screenshot during a gas tight test on a CA room.

5 STOREX APP, ADM AND STOREX REMOTE SERVICE

5.1 Remote control via the Storex/Vijeo App

The Autostore MaC software is prepared for displaying *all touchscreen functions on the Vijeo/Storex App for smartphone or tablet*

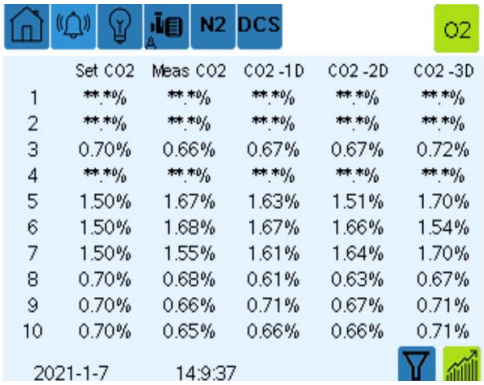
This provides major advantages:

- Very pragmatic to have always and everywhere access to measured values and the operation of the CA system.
- Storex service engineers can assist you by giving advice and checking based on direct access to the touchscreen.
- We deliver a router and a secured VPN (internet) connection.
- The client has to provide an internet connection to the router.
    - Minimum requirement for internet speed: 2 Megabits/sec.
    - If there is no good internet connection Storex can provide a 3G/4G GSM modem, additional costs apply, further, to be discussed.
- The Vijeo/Storex App has to be installed on your smartphone/tablet via App Store/Play Store. (Approx. costs € 30, - for the App, not included in the offer).
- Storex will provide you for your VPN connection a password for access to your CA system.
- On your phone you will have an App for opening / closing the VPN connection and the Vijeo/Storex App.
- After opening the VPN connection and the Vijeo/Storex App you can select your scrubber and via the router your touchscreen will be visible on your smartphone/tablet.

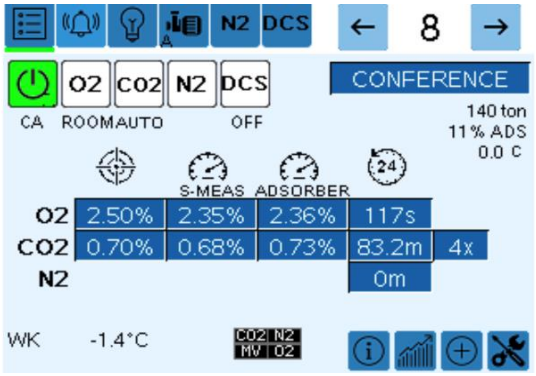
The VPN connection is used for 2 purposes

- The use of the Vijeo/Storex App.
- Access to ADM program (if installed).

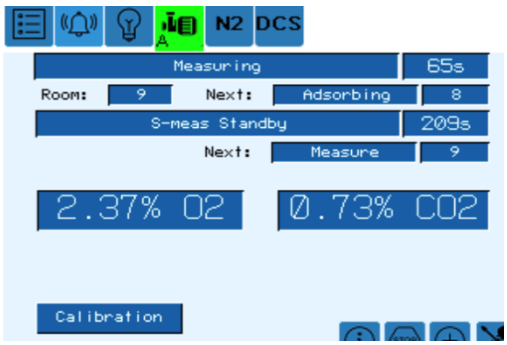
During the first year the use of the App and VPN connection is included in the purchase price.
After the first year, yearly costs apply for the VPN connection and the use of App of € 50,-.
These costs are needed for maintenance and services for the use of the App and for services on the availability and security of this VPN connection.



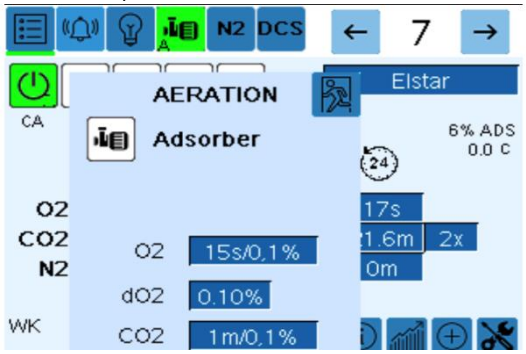
Overview of measured values during a period of time



Detail CA control / DCA room



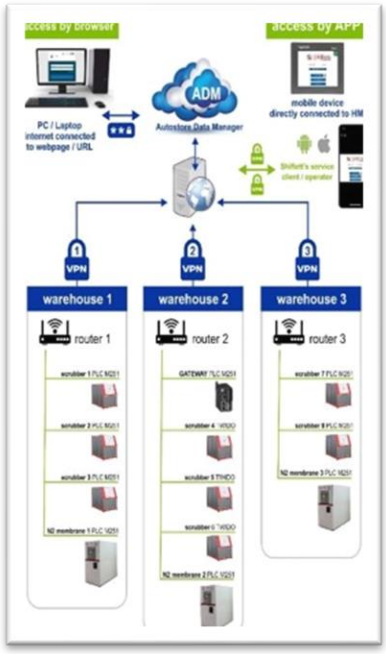
Actuel status of operation of the control system



Adjustment of settings for the control system for aeration

5.2 Auto Store Data Manager (ADM system)

The ADM system is a website which is connected with the Autostore Mac System of your CA installation via a VPN connection and a router. The same router/VPN connection as used for the App can be used for the ADM as well.



The ADM has following functions:

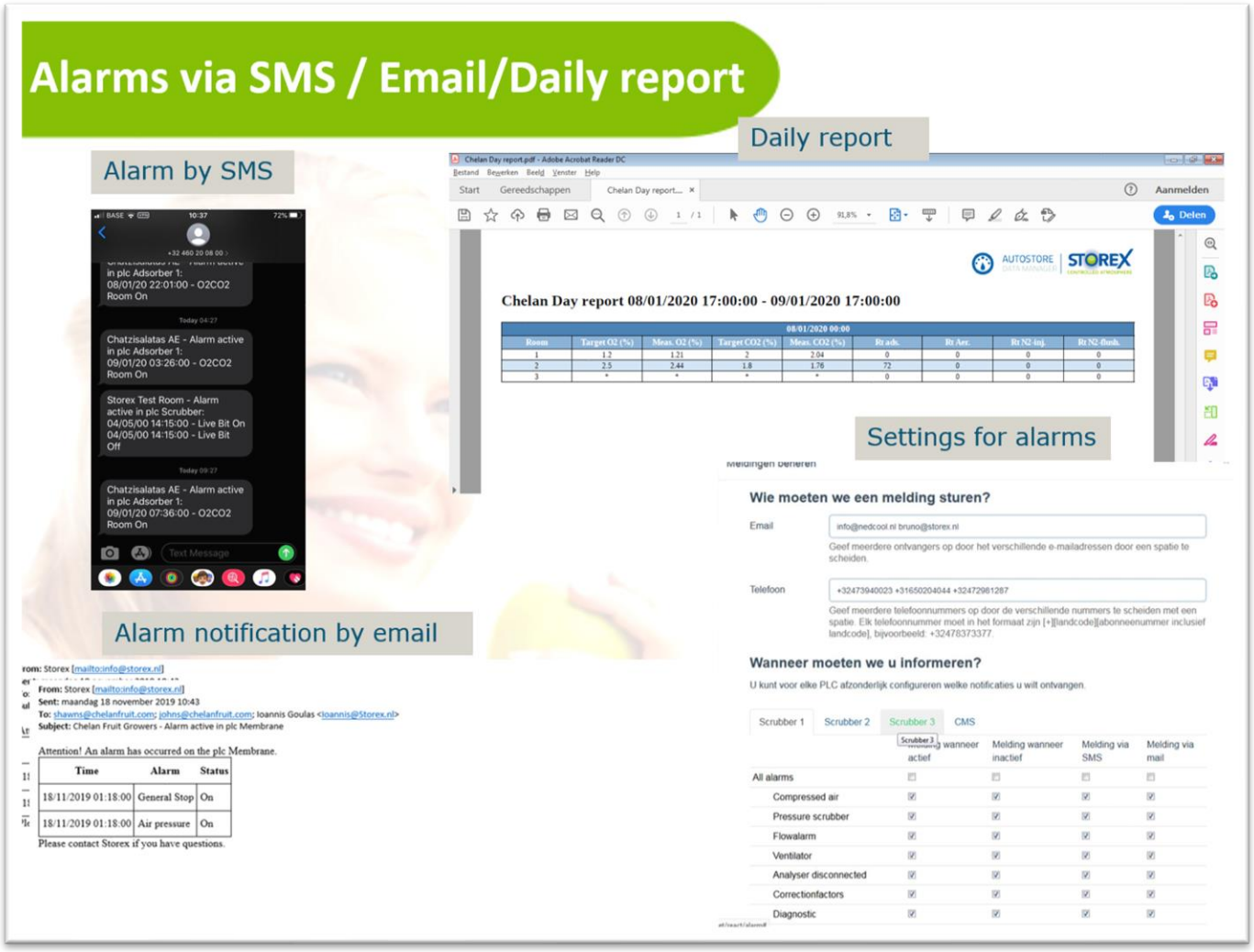
- All relevant information of your CA system will be saved both in the ADM cloud as on a SD memory card in the PLC. The memory space is limited in the PLC for ca. for 1 year.
- Settings can be viewed and adjusted.
- Multiple graphs can be made of:
  - settings and trends of measured O2/CO2 values,
  - operating hours for scrubbing, aeration, and N2 injections,
  - Temperature and pressure readings if installed.
- The results of the Diagnostic system are visible for optimum tuning of the scrubber
- Sending selected alarms by email/SMS.
- Logbook function

The use of ADM and the App is free during the first year. Yearly costs after the first year are € 170,- for the VPN connection, the use of the ADM system + App.

Below a scheme how the system is organized. On each location; one scrubber, + one VSA + router. The data is visible via the App and via ADM on a PC/Laptop.

Screenshot of graph with CA control details

SPECIALISTS IN CA SYSTEMS



5.3 Storex Remote Service

Via the secured VPN network connection, Storex/Local technicians have remote access to your CA-installation for providing various services such as:

- Provide assistance on all your possible questions,
- carry out system checks,
- run the auto-diagnostic system for checking the low oxygen content working of you system,
- checking the settings of you scrubber,
- carrying out software-updates if this may apply.

This service has proven to be very effective. Standstill-, maintenance- and repair costs can be limited to a minimum.
Based on fair policy use you can consult our technicians without additional costs during the 1st year of operation.
After this first year we are of course also available for service. It can be agreed if you want to make use of this based ‘on demand’ or on a service agreement.

6 DCA SYSTEM WITH DCA PRO ANALYSER

6.1 DCA Pro measurement system

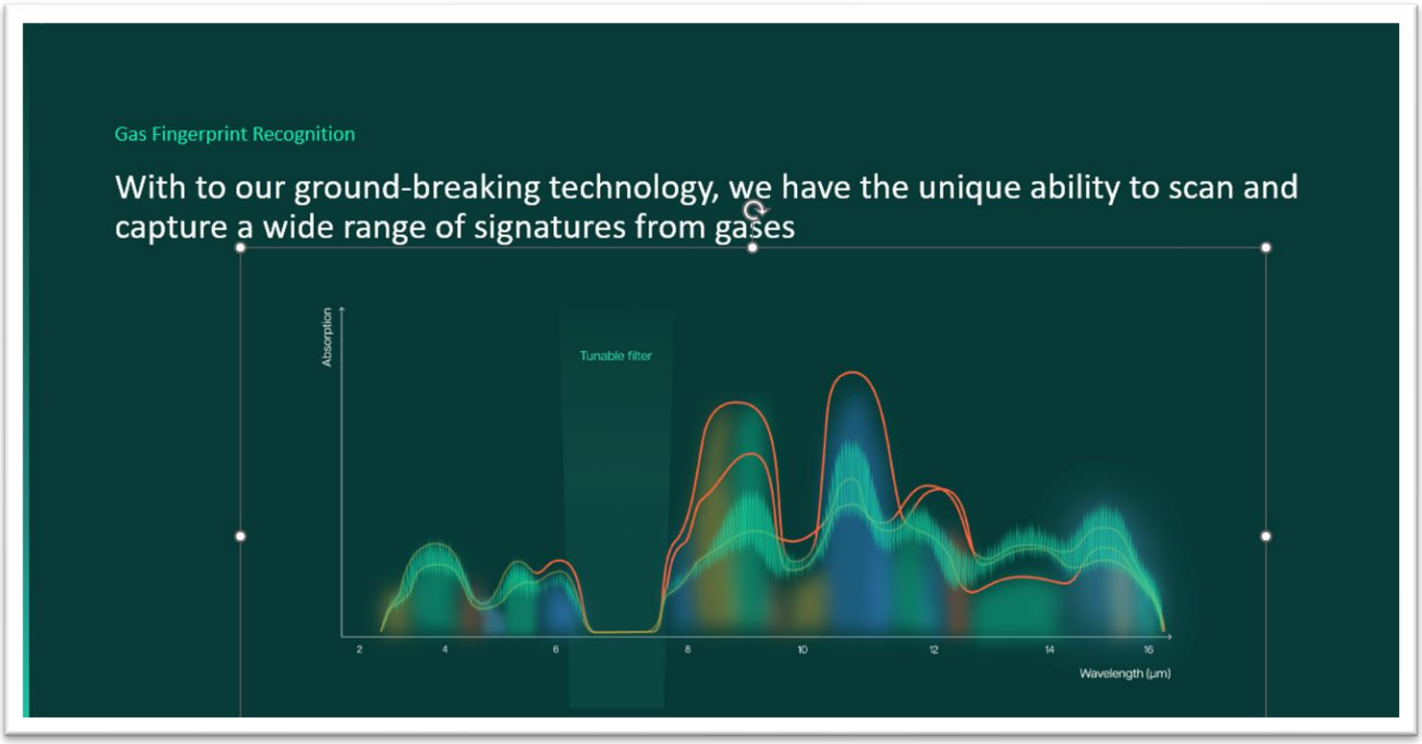
A measurement tower will be installed consisting of following parts:

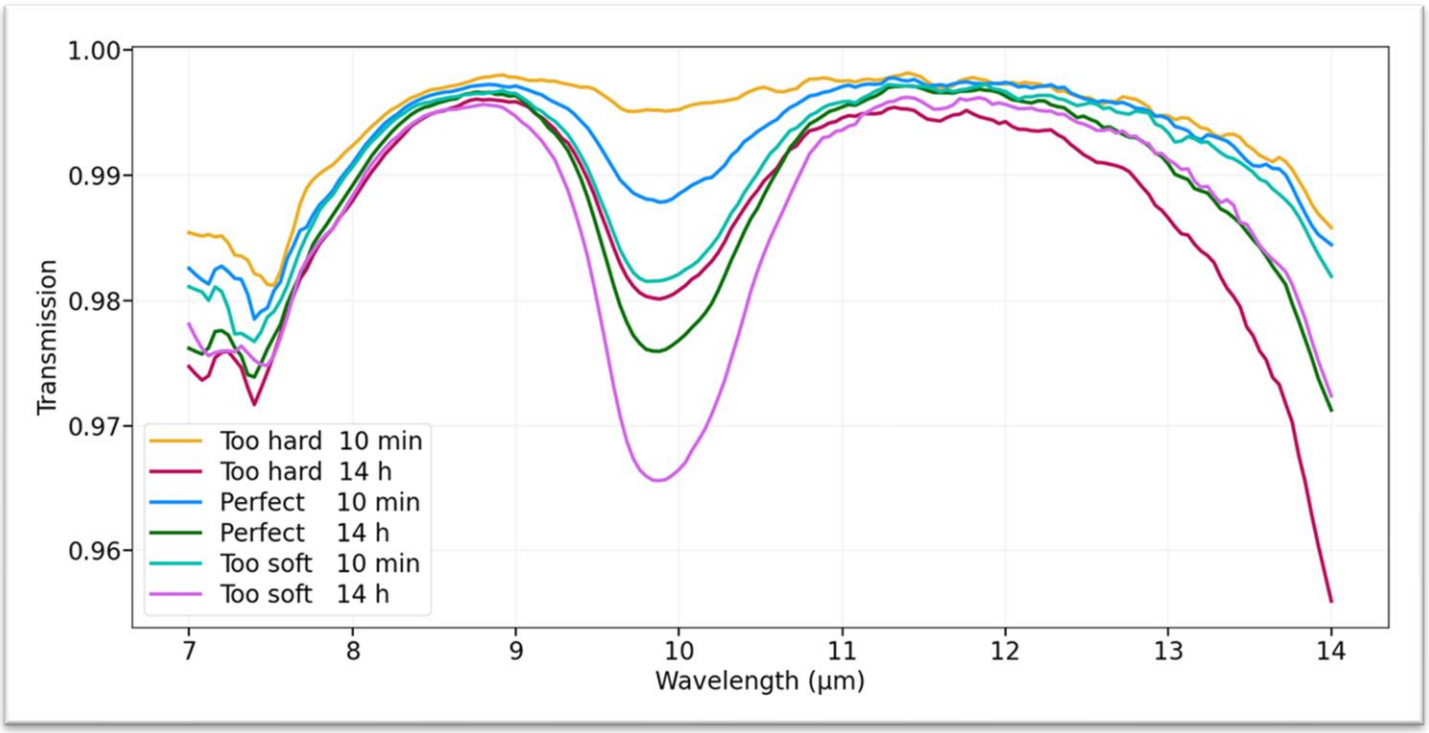
- PLC control system +I integrated in the Autostore control system
- Measuring valve and tube connected with the DCA room
- DCA Pro analyser suitable for:
  - Ethanol readings
  - Ethylene readings
  - Fingerprint of present gases (under testing)

Each day the DCA Pro system is making a reading of the present gases in the CA room.
Per room a time schedule can be programmed for O2/CO2 for a gradual pull down of the oxygen level to desired lowest Oxygen level. After each pull down step there is a programmable period of days for adjustment of the fruit to the lower oxygen level. In case the DCA Pro analyser is monitoring during this days an increase of ethanol in the head space an alarm signal will be given as a sign for the presence of anaerobic fermenantation. After such signal is registrated the oxygen level will be adjusted automatically for preventing development of anaerobic fermentation. Besides the monitoring of ethanol production the system will also monitor the the trend of respiration and ethylene in the CA room. The system will also monitor an increase of respiration and if an alarm is generated caused by increase of CO2 production during the pull down procedure and during the storage at DCA low Oxygen values below 1%O2 and then the oxygen level will be automatically adjusted.

Graph below shows a period of 0,4%O2 followed by an increase ethanol production.

Besides the monitoring of ethanol production and ethylene production the DCA Pro sensor also has the possibility to scan and capture wide range of signatures of gases produced by the fruit and in a spectrometric graph of the present gases. By following this spectometric graphs in time development of a level of decay or elderdom can be visualized. This system is under testing and can be integrated in case the DCA system will be part of the project.
Below pictures of the spectrometrich graph and the a graph of translated wavelengths in time of avocados for decay research.


Gas Fingerprint Recognition
With to our ground-breaking technology, we have the unique ability to scan and capture a wide range of signatures from gases
Absorption
Tunable filter
2
4
6
8
10
12
14
16
Wavelength (µm)


1.00
0.99
0.98
0.97
0.96
Transmission
Too hard 10 min
Too hard 14 h
Perfect 10 min
Perfect 14 h
Too soft 10 min
Too soft 14 h
7
8
9
10
11
12
13
14
Wavelength (µm)

7 STOREX VSA N2 GENERATOR

7.1 VSA N_2 generator Type 50 and Type 60

Storex is delivering VSA generators for more than 25 years to the fruit storage industry with excellent results for good performance, low maintenance costs, low energy costs and reliable working! To achieve a pull down of a big room in 24 hours from 21 to 2% O2 we offer 2x VSA N2 generators type 60.

Main features of Storex VSA N_2 generators:

- Lowest Cost of Ownership
- Nitrogen is produced based on the principle of VSA/Vacuum Swing Adsorption.
- This working principle offers main advantages:
  - Energy efficient, ca. 30% less energy use compared with PSA, because of its working principle very reliable
  - Working pressure 1 Bar, no use of high pressure (8 bar)
- The use of contact free working claw compression blower and vacuumpump;
  - Very low maintenance
  - No use of oil in blower pump, no risk on pollution of active carbon by oil vapour (compare PSA)
  - No use of oil on vacuum pump (no need for replacement of expensive oil vapour filters or adding oil)
  - No wear and tear of expensive rotary vanes (low maintenance costs!).
  - No capacity-reduction because of wear of rotary vanes

VSA Type 60

We provide for our VSA generator a full 2-year warrantee.

Technical specifications Storex VSA-N_2-Generator Type 50

Capacity	**48 Nm^3/hour 97% N_2 and 3% Rest O_2 (based on inlet of 100% ambient air)**
Pressure	1 Bar
Valves	6 pcs. 1 ¼ ” Electro pneumatic piston valves
Required diam. Supply piping / injection valves	>40mm / 1” -11/4”
Flowmeter	Included + flow regulation valve
Air filters	1x Inlet air filter for ambient air 1x Air filter for produced nitrogen
Switchbox	Included for stand-alone and automatic operation Emergency switch Hour counter
Blower	Bush Mink Claw compression blower Type 1102BP
Air cooler	Included
Vacuum pump	Bush Mink Claw compression vacuum pump Type1252AV
Total Power installed	8 kW 380V, 3 phase, 50Hz.
Fuse	32 Amp.
Power consumption	<8 kW
Sizes unit with pumps	wxdxh;. 1520 x 1.300 x2050 mm
Transport by forklift / pallet truck	Yes
Total weight	1106 kg.

Technical specifications Storex VSA-N_2-Generator Type 60

Capacity	60Nm³/hour 97% N_2 and 3% Rest O_2 (based on inlet of 100% ambient air)
Pressure	1 Bar
Valves	6 pcs. 1 ½ ”Electro pneumatic piston valves
Required diam. Supply piping / injection valves	>50mm / 1 ½””
Flowmeter	Included + flow regulation valve
Airfilters	1x Inlet air filter for ambient air (1 micron) 1x Air filter for produced nitrogen Filtration grade 0,01 micron
Switchbox	Included for stand-alone and automatic operation Emergency switch Hour counter
Blower	Bush Mink Claw compression blower Type 1142BP 7,5kW
Air cooler	Included
Vacuum pump	Bush Mink Claw compression vacuum pump Type1322AV 5,5kW
Total Power installad	13,5 kW 380V, 3 phase, 50Hz.
Fuse	32 Amp.
Power consumption	<12 kWh.
Sizes unit with pumps	wxdxh;. 1600 x 1.750 x1820 mm
Transport by forklift / pallet truck	Yes
Total weight	1500 kg.

Note for VSA and PSA apply:

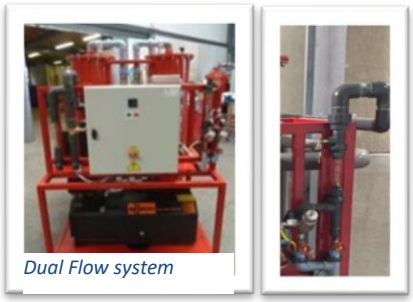
- Capacity variance ±5%
- The indicated purity [%] is an average value
- Nm³ = Normal Cubic Meter – reference conditions to 20 °C, 1013 mBar.
- For the compressor for the PSA the air consumption is based on the nominal temperature and altitude
- Production efficiency of Storex VSA: >2:1 – for 1m³ we need an inlet of 2m³

- For the operation of the pneumatic valves compressed air at 6-8 bar is required. The air consumption of compressed air is relative low<0,05m3/min. A compressor with an inlet capacity of 400 liter/min is sufficient.
- The use of good quality compressed air is advised, which means filtered for moisture and oil. This is important for ensuring long term good working of the electro pneumatic valves. Note; compressed air is only used to operate the valves.
- Install the VSA N2 generator on a good fundament free from vibrations
- Install the VSA N2 generator in a well ventilated technical area and prevent operation temperatures higher than 40°C. This can cause damage to the oil in the gearbox of the pumps.
- The air released by the vacuum pump should be vented to the ambient air.
- Required maintenance:
  - Oil change of gearbox between pump and electromotor each 2.000 hours ca. 1 liter
  - Change of paper filters in inlet filter of blower and filter of produced nitrogen. The frequency is depending on the quality of air sucked into the blower.
  - Regular inspection on proper function.
  - Note the required maintenance is relatively very low.

7.2 Dual Flow system for producing N2 with normal (97%) and high (99%) purity

The flow in m^3/hour of the VSA Generator is regulated by a regulating valve. By increasing or decreasing the flow by using a manual regulation valve, the purity can be set. The flow and purity are pre-set on per example 65 m^3/hour with an average purity of 3% O_2 and 97% N_2.

With the Dual flow system, we install a by-pass which can be closed for reducing the flow and increasing the purity. This is useful for the situation when we want to control with a small flow low oxygen level below ca. 1,5% O_2 in the CA room. The Autostore MaC system will regulate this automatically.



Dual Flow system

7.3 N2 distribution to the CA rooms

The produced N_2 will be transported through 50 mm PVC piping and inserted via electro pneumatic valve into the CA room.

Insufficient gas tightness is often the reason that low (DCS) O_2 target values cannot be realized. To a limited extent by providing a small purge of N_2 with an high purity (99% N_2 and 1%O_2) this problem can be solved. By the purge of N2, a small overpressure is created and the influx / insert of ambient air into the CA room is prevented. The purge of N2 is controlled by the Autostore program.

8 AERATION OF CA ROOMS

8.1 Aeration fan per CA room

The room ventilator can be used for inserting ambient room into the CA stores by this external ventilator.
The room ventilator will be delivered complete with a suction filter, and under pressure valve to provide gas tightness.

Please be informed that in our scrubber design and Autostore MaC system we can also aerate the CA rooms automatically by opening an valve for a controlled period of time during the scrubbing process.
Under certain circumstances, however an external room ventilator can be preferred. For the present offer we estimated that this option is not needed.
For the reason that we want to inform you about a nr. of relevant options we did include this option in this offer.

9 ROOM ACCESSORIES

9.1 Air buffer

The air pressure in a CA room will fluctuate continuously. This is caused by temperature changes caused by cooling and defrost actions and atmospheric pressure changes. For easy adjustment on varying air pressure changes on each CA room a flexible air buffer will be installed. A main advantage is that the input of ambient air will be minimized. The flexible air buffer has a content of 4 m^3 and is made of gastight, strong and very flexible Polyurethane (PU) material. The buffers will be delivered with the necessary materials for installation on the room.

The calculation and list of materials is based on mounting the buffers on top of the cold store.

9.2 Under /overpressure valve type 160mm.

The over- and under pressure valve provides a protection against damage of a CA room caused by excessive under-/ or overpressure. The valve opens by an over- or under pressure of more than 10 mm water gauge.

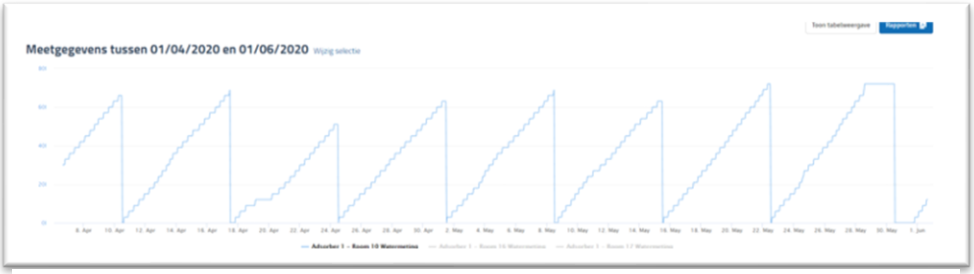
9.3 Room testing tube and gas sampling valve

By the gas sampling valve, a CO_2/O_2 measuring can be manually performed with a portable $CO2/O_2$-analyser.
The room testing tubes do have a diameter of 50 mm and are closed with a screw cap. On the room testing tube a room leak-apparatus for the CA room can be connected to check the gas tightness of the room.

9.4 Automatic water loss meter per CA room (optional)

An automatic water meter can be used in order to measure automatically the water loss. This information is valuable for controlling the water loss of the fruit. Data can be exposed in graphics on the display of the scrubber.
The automatic water consists of a water collector with a pre calibrated collector, a swimmer + level switch and a 3-way valve.
As soon as the collector is filled and the level switch is contacted, the water will be released and a pulse will be registered in the Auto store CMC program.
We supply one automatic water meter exclusive PVC for supply and discharge of defrost water.

Below a graph of water loss measurement.



Weekly readings of waterloss per room

9.5 Air compressor, buffer tank and cool drier

The air compressor is required for producing good quality compressed air, free of oil and water vapor to secure a good working of the pneumatic valves. The compressed air should meet the ISO standard of at least 4.4.4

Specification of Compressor:	
Type	: Piston air compressor, 2 cylinders
Suction capacity	: 400 Liter/minute
Effective capacity	: Max. 280 Liter/minute
Tank content	: 100 L.
Working Pressure	: 10 Bar
Power	: 3 Hp
Sizes LxWxH	: 98 x 48 x 90 cm.
Weight	: 81 kg.

Options for compressor with cool drier		
Condensation drain	Automatic release valve (½”) for condensation water in tank.	Included
Water vapor removal	Cool drier	Included
Electro package Scrubber	The switchbox of the scrubber is provided with a power supply system for the compressor and provisions for reading the working hours, including alarms on possible leaks and an operation program for the adsorption dryer and a release valve on the oil filter.	Included

10 TEMPERATURE MEASUREMENT AND CONTROL

10.1 Temperature measurement and control on 2x 10 (D)CA rooms

The control of the central cooling unit and the temperature control at room level will be controlled by processors. Settings can be made on a PC, tablet of smartphone connected with internet, specifically for the refrigeration installation. The minimal needed functions of for the control per room are described below.

Each CA room will be equipped with at least 4 temperature sensors (PT1000). The cables used will be protected against influencing temperature and induction. Temperature sensor cables, 12, 24 Volt cabling and 230 and 400 Volt are placed in separate cable ducts. The temperature sensors will have the following functions and position:

4. Sensor

Sensor function	Position	Note
Control sensor	Suction side cooler	Mounting at fixed place free of wall (100 mm), at least 1,000 mm below evaporator
Coil sensor	Between lamella cooler	Mounting at fixed location in evaporator (coldest position)
Product sensor cold	Along wall opposite cooler	Transit through ceiling with at least 8 meters of free cable
Product sensor warm	Along wall under cooler	Transit through ceiling with at least 8 meters of free cable

In the event of failure of the central cooling control system (PC/PLC), cooling will continue based on the last settings. All sensors are mounted in such a way, to enable calibrating in ice water. The product sensors can be wrapped at a position along the wall.

The minimum functions (settings) of the cooling equipment related control of the CA rooms are:

5. Functions and setting cooling control per CA room

Function	Remark
Temperature	• Setting room temperature per 0.1 degree in range -10 to +40 ^{0}C • Differential setting between a minimum of 0.2 and 3.0 Kelvin/Celsius • May / should and relay scheme in cooling • Possibility to group rooms in cooling • Setting of number of rooms that are allowed to cool simultaneously of the cooling unit
Air circulation	• Adjustable per room • Automatic circulation • Continuous circulation • Adjustable circulation time after cooling action • Interval circulation (between cooling actions) with adjustable time for circulation and pause/time out • Link circulation to specific control (including absorption scrubber) through potential free contact
Defrost	• Adjustable per room • Type defrost adjustable per cooler (hot glycol or air) • Defrosting frequency adjustable based on interval time (fixed absolute time or linked to cooling hours) • Adjustable specific defrost times • Termination of defrosting both on temperature (block sensor) and time (maximum time) • Adjustable dripping times

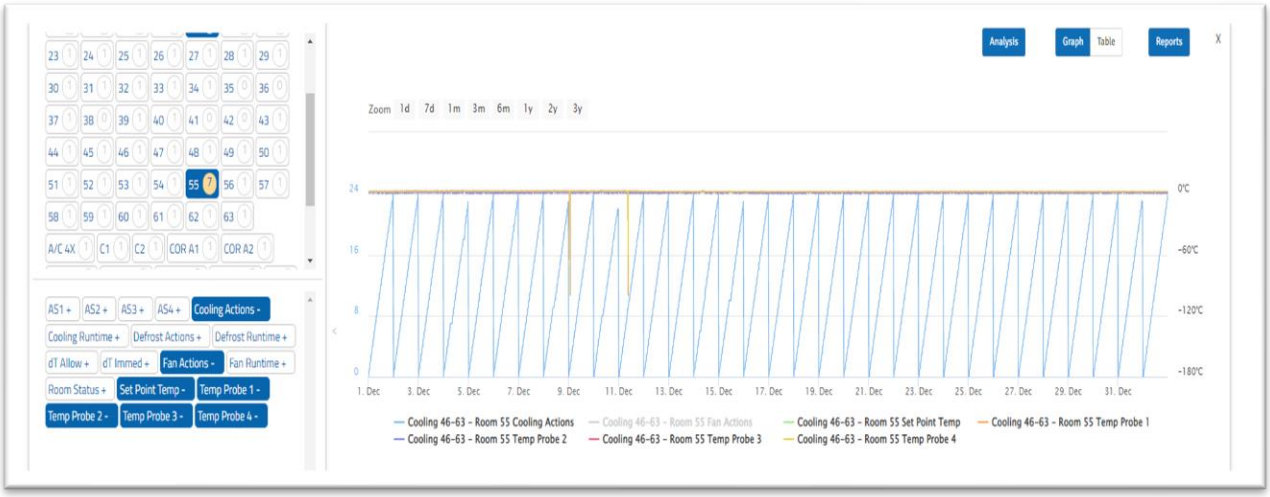
- Adjustable freezing times (after defrost)
- Defrosting the allowable number of cells simultaneously

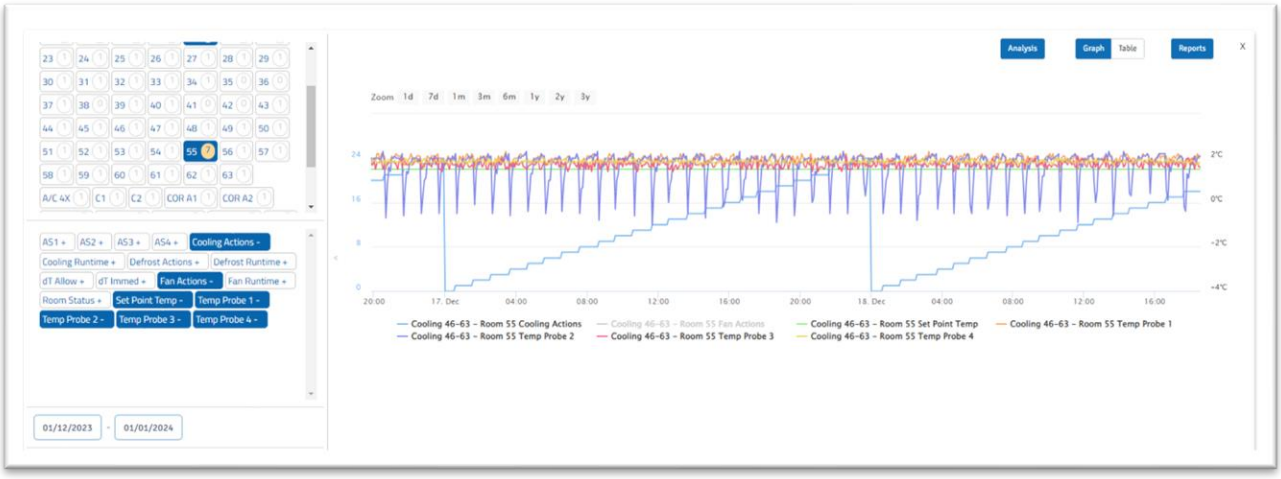
At least the following components in cooling control are registered:

- registration of all actual temperature sensors (with adjustable measuring frequency)
- registration of current and history (per day & week) of duration and number of cooling actions
- registration of current and history (per day & week) of duration and number of circulation actions
- registration of current and history (per day & week) of measured condensation water per day (signal from condense water sensors) in litres
- registration of actual status room (on, off, manual interruption as off on work switch)

Cooling 31-45

Room	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	COR B1	COR B2	COR B3
Roomstatus	Off	Precooling	Precooling	Precooling	Precooling	Off	Off	Off	Off	Precooling	Precooling	Off	Off	Off	Off	Off	Off	Off
Temp. Setpoint	5.0 °C	4.9 °C	4.9 °C	4.9 °C	4.9 °C	5.0 °C	5.0 °C	5.0 °C	1.5 °C	20.0 °C	5.0 °C	1.0 °C	1.0 °C	1.5 °C	1.0 °C	15.0 °C	15.0 °C	15.0 °C
dT Start allowed	0.5 °C	0.5 °C	0.5 °C	0.5 °C	0.5 °C	0.5 °C	0.5 °C	0.5 °C	0.5 °C	0.5 °C	0.5 °C	0.5 °C	0.5 °C	0.5 °C	0.5 °C	0.5 °C	0.5 °C	0.5 °C
dT Start immediately	1.0 °C	1.0 °C	1.0 °C	1.0 °C	1.0 °C	1.0 °C	1.0 °C	1.0 °C	1.0 °C	1.0 °C	1.0 °C	1.0 °C	1.0 °C	1.0 °C	1.0 °C	1.0 °C	1.0 °C	1.0 °C
Thermostat	16.2 °C	5.3 °C	5.0 °C	5.4 °C	4.8 °C	15.7 °C	17.6 °C	16.4 °C	18.4 °C	18.4 °C	4.7 °C	16.6 °C	18.0 °C	17.7 °C	18.1 °C	16.0 °C	16.6 °C	17.8 °C
Defrost	16.6 °C	4.8 °C	3.3 °C	4.9 °C	3.5 °C	16.7 °C	18.3 °C	16.9 °C	18.4 °C	17.6 °C	4.1 °C	17.2 °C	18.6 °C	18.4 °C	18.7 °C	15.8 °C	16.2 °C	17.6 °C
Product 1	13.8 °C	5.6 °C	4.8 °C	6.5 °C	4.5 °C	14.9 °C	14.9 °C	16.4 °C	17.5 °C	19.4 °C	4.9 °C	16.4 °C	16.9 °C	16.5 °C	16.8 °C	16.0 °C	16.6 °C	17.8 °C
Product 2	14.4 °C	4.4 °C	5.2 °C	4.7 °C	5.6 °C	14.8 °C	14.7 °C	15.7 °C	16.6 °C	18.4 °C	4.8 °C	16.1 °C	17.0 °C	16.6 °C	17.4 °C	16.0 °C	16.6 °C	17.8 °C
Actual Cooling Status	This room is off	Room is in precooling status and idle	Room is in precooling status and idle	Room is in precooling status and idle	Room is in precooling status and idle	This room is off	This room is off	This room is off	This room is off	Alarm	Room is in precooling status and idle	This room is off	This room is off	This room is off	This room is off	This room is off	This room is off	This room is off
Alarm Status	No Alarm	No Alarm	No Alarm	No Alarm	No Alarm	No Alarm	No Alarm	No Alarm	No Alarm	Room Temperature Too Low	No Alarm	No Alarm	No Alarm	No Alarm	No Alarm	No Alarm	No Alarm	No Alarm
Cooling valve status	Off	Idle	Idle	Idle	Idle	Off	Off	Off	Off	Idle	Idle	Off	Off	Off	Off	Off	Off	Off
Fan Status	Off	Idle	Idle	Idle	On Ventilation	Off	Off	Off	Off	Idle	Idle	Off	Off	Off	Off	Off	Off	Off
Defrost Status	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off
Cooling Actions	0 :	24 :	32 :	34 :	31 :	0 :	0 :	0 :	0 :	3 :	15 :	0 :	0 :	0 :	0 :	0 :	0 :	0 :
Cooling runtime	0 m	50 m	56 m	34 m	60 m	0 m	0 m	0 m	0 m	3 m	15 m	0 m	0 m	0 m	0 m	0 m	0 m	0 m
Fan actions	0 :	94 :	135 :	115 :	105 :	0 :	0 :	0 :	0 :	35 :	76 :	0 :	0 :	0 :	0 :	0 :	0 :	0 :
Fan runtime	0 m	314 m	322 m	247 m	327 m	0 m	0 m	0 m	0 m	241 m	183 m	0 m	0 m	0 m	0 m	0 m	0 m	0 m
Defrost actions	0 :	0 :	0 :	0 :	0 :	0 :	0 :	0 :	0 :	0 :	0 :	0 :	0 :	0 :	0 :	0 :	0 :	0 :
Defrost runtime	0 m	0 m	0 m	0 m	0 m	0 m	0 m	0 m	0 m	0 m	0 m	0 m	0 m	0 m	0 m	0 m	0 m	0 m
Cooling actions yesterday	0 :	37 :	47 :	45 :	60 :	0 :	0 :	0 :	0 :	1 :	21 :	0 :	0 :	0 :	0 :	0 :	0 :	0 :
Cooling runtime yesterday	0 m	85 m	76 m	45 m	125 m	0 m	0 m	0 m	0 m	1 m	22 m	0 m	0 m	0 m	0 m	0 m	0 m	0 m
Fan actions yesterday	0 :	137 :	163 :	145 :	143 :	0 :	0 :	0 :	0 :	21 :	99 :	0 :	0 :	0 :	0 :	0 :	0 :	0 :





11 INSTALLATION, PUTTING INTO OPERATION

11.1 Installation,

To be agreed. We include in our offer a budget for start up of the CA system. The installation of the materials for the control of the cooling are not included. The temperature sensors and control system will be delivered to the cooling company.

11.2 Installation, putting into operation

To be agreed. We include in our offer the presence of an engineer for a period of 6 working days including traveling including tickets and excluding local transport and staying costs.
In case he needs to stay longer the extra costs per day are € 550,-

12 TRANSPORT

Transportation and insurance during transport is excluded.
Our fees exclude any charge for delay in the country of destination if they apply.

13 PRICES

See enclosure

14 DELIVERY CONDITIONS

Delivery conditions	
Prices	: Prices are net and a excluded duties/local tax/ VAT
Guarantee	: 1 storage season on total installation, further to be agreed upon
Delivery	: Ex works
Delivery time	: to be agreed upon, after receipt of signed order confirmation and payment first term invoice
Payment conditions	: To be agreed upon

On all offers the Storex general delivery terms as printed on the backside of our paper are applicable. In case of digital offers the delivery terms are sent with the email.

14.1 Buyers requirements

- Supply of heavy forklift with driver to unload, move and install machines. In some cases a hydraulic work platform, a crane or something else will be necessary for installing the machines.
- Unloading of equipment at the buyer packing house.
- Supply of electricity and light for assembly.
- The rental of sky workers.
- Internet connection at switchbox of CO2 scrubber available during installation and startup. Minimum requirements for internet speed: upload speed 2 Mb/s, download speed 2 Mb/s.
- A stable surface, free of vibrations, for placing the equipment.
- A machine room with sufficient ventilation where temperature will not exceed <+1ºC and +40 ˚Celsius.
- Supply of sufficient fruits and packaging for test.
- The installation will be placed in ambient temperature between
- Connecting voltage:
- - 230/400V - 3 phase 50Hz + 0 + earth with sufficient power and filtered and stabilized if necessary.
- Other voltages on request.
- Electrical supply with sufficient capacity to the switchbox (es).
- Compressed air (if applicable). Compressed air must be available immediately for the installation and test runs of the machines:
    - Minimum pressure: 7 bar.
    - Quality: The compressed air must be clean, dry and free of oil.
- Disposal of packing-materials
- Representative from buyer have to be present from beginning of assembly.
- Operator will be trained and he will operate the system afterwards.

14.2 Storex service & installation

- A contact person with the power of decision should be appointed by the buyer as conversation partner during the course of a project, installation and instruction.
- The work space must be lit sufficiently during the installation of the machine(s). Also the buyer must make sanitary provisions available to the installers.
- The buyer must give our employees the opportunity to complete their work in a respectable and safe fashion. The buyer must also inform our employees of the internal safety regulations.
- The buyer will provide a lockable area to safely store tools and other costly objects in.
- Unless otherwise indicated in this offer or confirmation, no account has been taken of fire routes, fire alarm systems or their control which are possibly necessary.
- The buyer will grant us permission to film and photograph the whole CA system for advertising purposes after the commencement of operations.