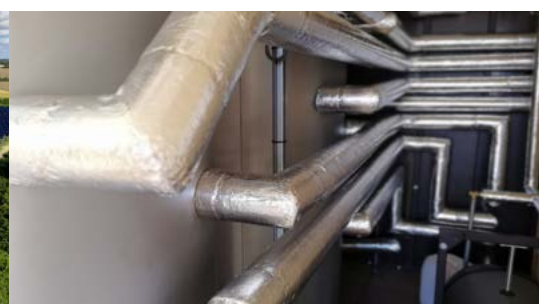


CATALOGUE

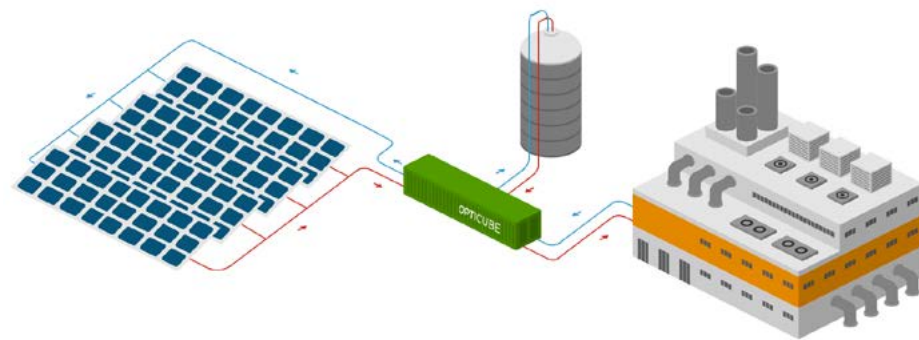
OPTICUBE FIELD



THE BASICS

The Opticube Field is specially designed to simplify the modeling and installation of the heating room used in large collector fields. Indeed, gathering all functional units in one or more turnkey storage containers simplifies project management from quotation to commissioning.

Sunoptimo has therefore created a range of standard solutions in different sizes: from DN80 to DN250. Various options are also available so that the customer can keep a high degree of modularity on the selected Opticube Field.



*From 800 to 30.000 m²
solar collectors*

The Opticube Field concept starts around a 40 foot double door container (one on each side). It is then modified and equipped in the workshop to meet the needs of the customer. This way, the container is transformed into a real turnkey heating room.



COMPONENTS

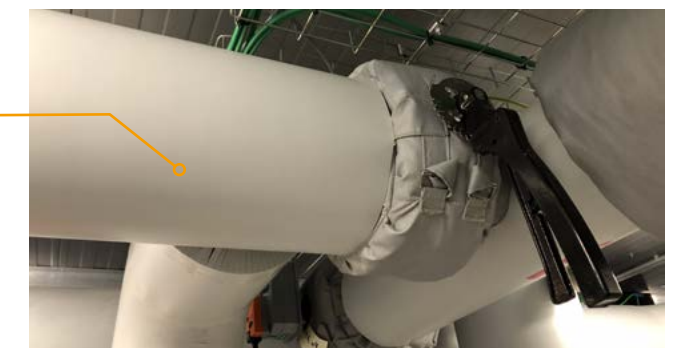


Container insulation

The containers are insulated to avoid condensation inside and to help maintain a frost-free environment in winter. That's why the container is completely insulated. The walls and ceilings are insulated from the inside with 4 cm thick PUR iso sheets.

Piping insulation

In order to minimize heat losses, the pipes are insulated with rockwool and protected by PVC shells. The insulation in place is class 4 and complies with EN 12828. Finishes on the end caps are made with aluminum shells. The valves and other organs are insulated with tailor-made hulls.



Temperature management

Given the insulation in place and the heat sources, there is a risk for the electrical equipment to heat up inside the container. In case of frost, it is also necessary to protect the pipes from freezing. For these purposes, Opticubes Field are equipped with ventilation grills, a fan and an electrical radiator.

Connection

To avoid pipes on the open air, the connection of the buried pipes to the Opticube is made thanks to a hatch in the container floor, or with connection flanges on the walls.





Maintenance support

The Opticube is designed to facilitate the implementation of a project, but also to facilitate the maintenance of the installation. The equipment is set in a way that they can all be removed separately without having to dismantle other equipment pieces. A good marking is established for a quick and straightforward understanding of the hydraulic and electrical system. It makes it easy to locate the different components.

Electricity

At the electrical level, all the equipment is connected and the power supplies and measurement signals are brought to a box via cable trays or PVC sheaths. To connect the PLC automat through that box, just plug it to the terminal blocks. The different equipment and metal parts must be connected back to the ground. An earth rail is delivered in the container and must be sunk to the ground and connected to the general earth terminal of the container.



Pump groups

On both sides of the heat exchanger, liquids must circulate in order to transfer heat efficiently. Each pumping unit is equipped with a filter, shut-off valves to allow isolation of the filters and variable flow pumps to optimize energy production.

Filling kit

During commissioning, the entire solar network must be filled with coolant that is also frost-resistant. The Opticube Field is therefore equipped with a pumping unit that can fill the network from the Overtank. This pumping kit is also used to pump back the fluid into to the network in case it has been previously evacuated to the Overtank through the safety valves due to overheating.



Heat exchange

In general, the solar circuit is filled with glycolated water and pressurized. To avoid excessive volumes of glycol and to isolate the solar circuit, the use of a heat exchanger is necessary. Standard exchangers are soldered stainless steel plate exchangers. For large installations, an exchanger battery is installed to guarantee a maximum of 5°C pinch. On request we can also provide removable plate heat exchanger with seal.

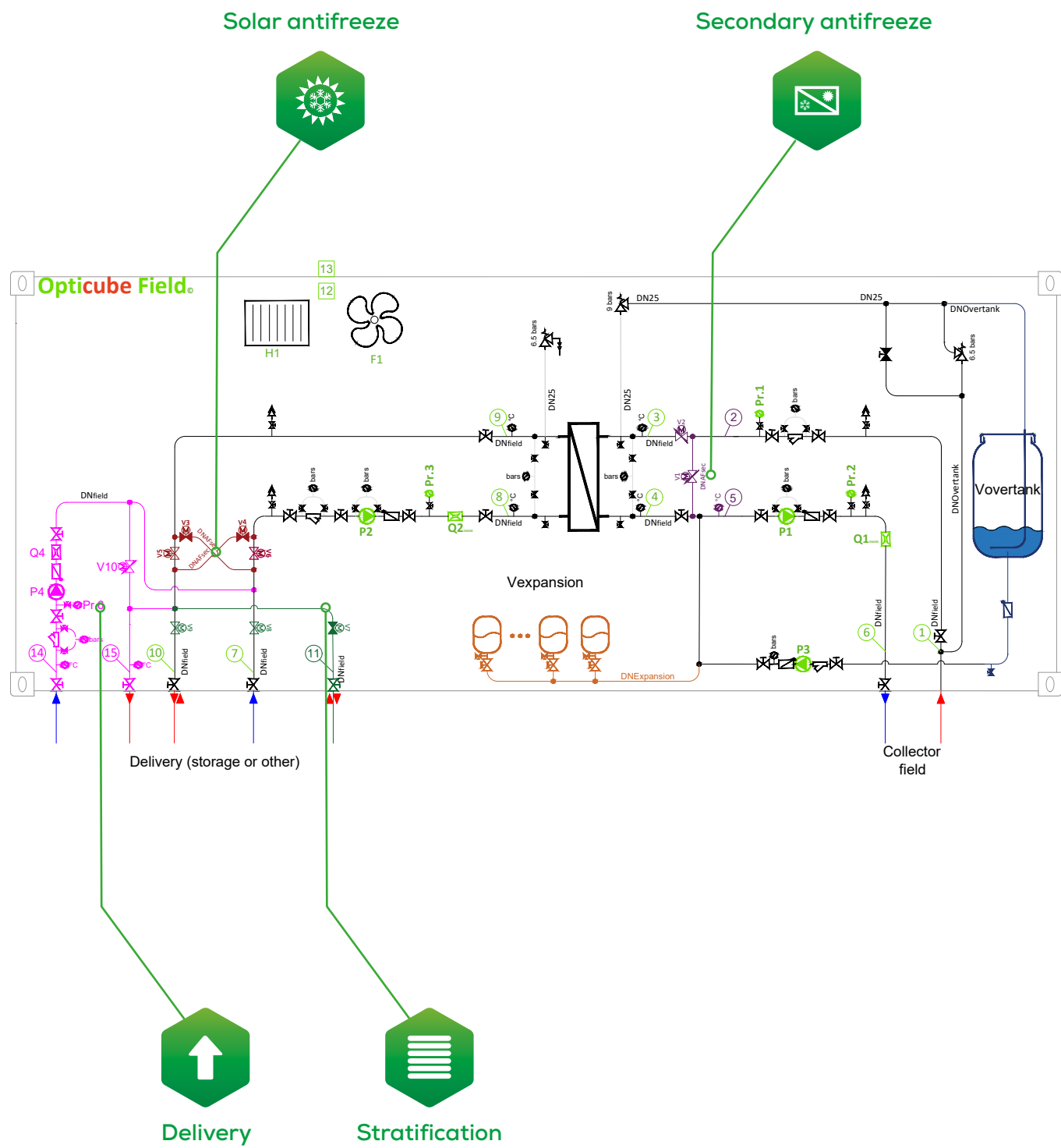


Measuring instruments

To regulate the installation and ensure its real-time operation, various measuring devices are installed on the network. For temperature, PT1000 probes are placed in thermowells, pressure is transmitted by means of electronic pressure sensors and flow rate is measured by impulse flow meters. For more convenience inside the container, manometers and thermometers are also installed at key locations.

AVAILABLE OPTIONS

Below, the hydraulic diagram shows the basic Opticube Field completed with the various options available. For a better understanding, they have been put in color, and they are described one by one on next page.



Solar antifreeze

In frosty weather, the temperature of the solar fluid can drop below 0°C. The solar antifreeze option prevents the solar fluid from reaching the solidification point. First, the solar pump (P1) makes the liquid circulate in the network to heat up the collector field by recovering heat from the underground part of the network. The circulation in the network also avoids stagnation in the pipes, which can lead to ice formation. The liquid that returns to the Opticube field can potentially have a temperature below 0°C. It would therefore be dangerous to pass it through the exchanger. The antifreeze option therefore allows the exchanger to be bypassed during this initial phase. If the cold persists, a heat source must take over. By reversing the direction of the secondary network piping (see secondary antifreeze option) and turning on the secondary pump (P2), the secondary network provides heat to the exchanger, which can then transfer it to the solar network. The control valves (V1 and V2) are used to control the initial temperature of the fluid going to the collector field. The pipe size for this option is smaller than the main pipe.

Secondary antifreeze

In brown, on the secondary side (to the left of the exchanger), there is a double bypass with valves that can reverse the flow and thus circulate the circuit the other way around. This ensures that we have a source hot enough to heat the solar fluid in time of persistent gel. This option is complementary to the solar antifreeze option. Regarding piping sizes, same thing applies as for the solar antifreeze option.

Opticube Field DN...	80	100	125	120	200	250	300
Antifreeze DN...	40	50	60	80	100	125	150

Stratification

The stratification option is in dark green on the hydraulic diagram. This option adds a connection making it possible to stratify the storage volume according to its own temperature and the temperature from the departure of the exchanger.

Delivery

The delivery option adds a pumping group which will be connected to a district heating network or another process depending on the application. The goal is to deliver the produced heat to a consumer. Depending on the degree of sunshine, this heat can come directly from the solar network or the storage tank. The Delivery option can be placed in the basic container up to the DN200. Above that, it will be installed in an additional container.

TWO PHILOSOPHIES

Various Opticubes Fields are available according to their options and sizes, but one important point is how to manage expansion. Thus, during the heating of the collector field, the solar liquid expands and the pressure of the system tends to rise and is taken up by expansion vessels. When the liquid overheats, it vaporizes which suddenly creates an increase in volume and therefore also in pressure in the closed system. There are then two ways to manage this overpressure.



«Liquid» philosophy

The expansion volume is only able to manage the expansion of the solar liquid. The passage to steam is taken care of by the safety valve that evacuates the excess pressure to the overtank whose volume must thus be more consequent. To restart the system, it is necessary to have a technician that will pump back the discharged fluid towards the solar network using the filling pump (P3).



«Steam» philosophy

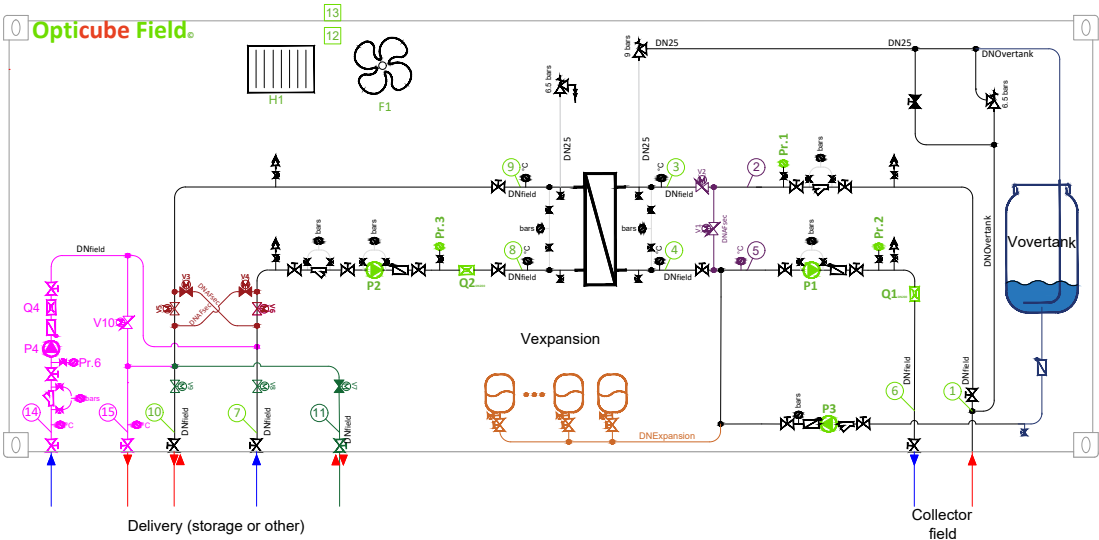
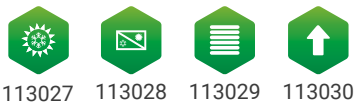
Le volume d'expansion permet à la fois l'expansion du liquide et le passage de la vapeur du liquide dans l'ensemble du système (volume du champ collecteur ainsi que des tuyaux chauds). Le volume de dilatation doit donc être plus important et le sur-réservoir peut être plus petit. Lors du refroidissement, le fluide solaire évaporé se condense et la pression chute. Les vases repoussent le liquide dans le réseau. L'intervention d'un technicien n'est pas nécessaire. Cette technique nécessite un vase préventif avant les vases d'expansion afin d'éviter le contact entre le liquide à haute température et la membrane des vases d'expansion.

Afin d'optimiser l'espace au sol des Opticubes, les vases d'expansion et le Overtank sont placés dans le champ des Opticubes si possible. S'il n'y a pas assez de place, les Overtanks sont alors des réservoirs externes tandis que le rôle d'expansion est pris en charge par l'Opticube Expansion. Ce dernier est un conteneur de 20' ou 40' qui contient des vases d'expansion et, si nécessaire, des prévases.



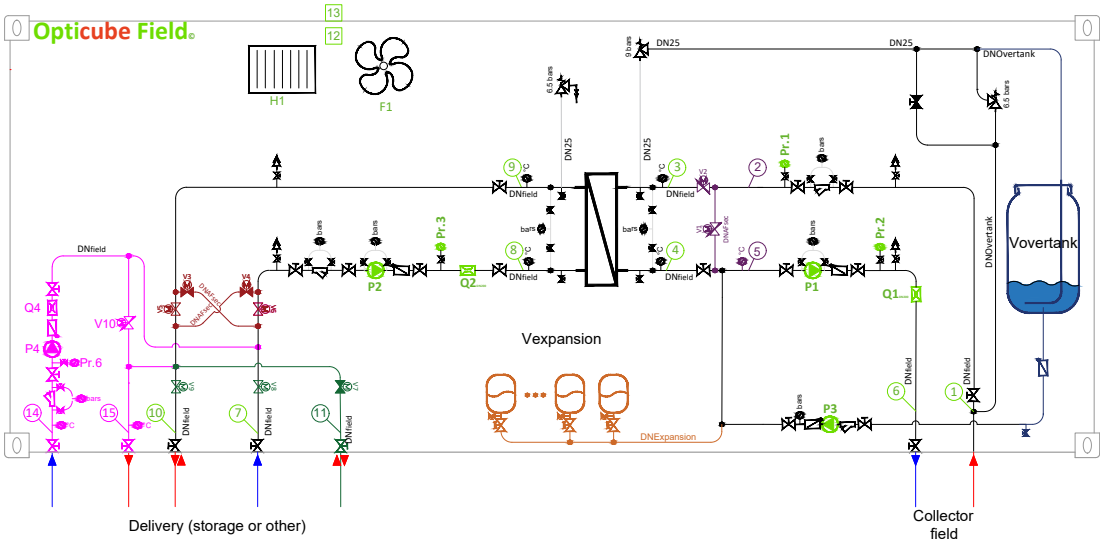
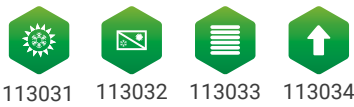
FULL RANGE «LIQUID» PHILOSOPHY

Available options

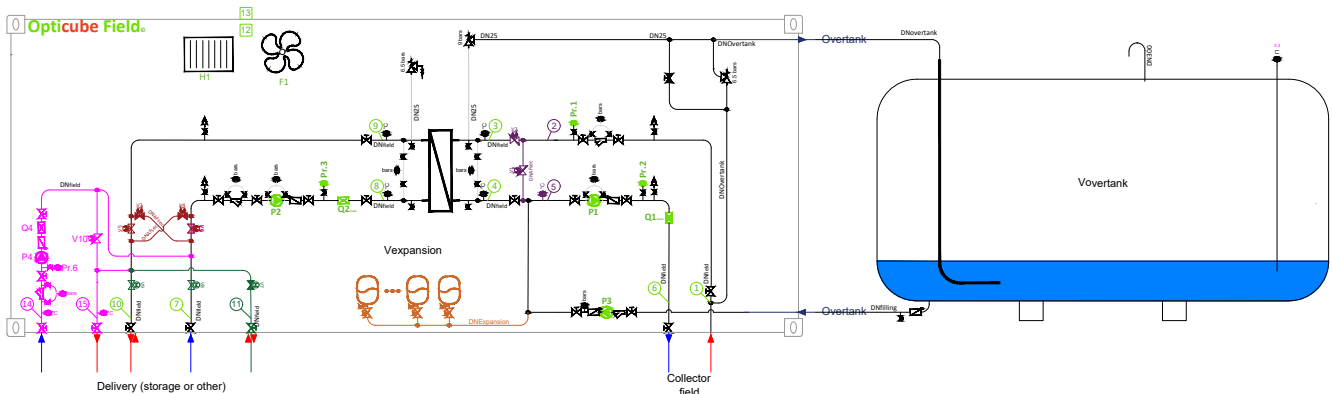


DN80 «Liquid»	Standard size...	...up to		
Solar surface	1.220 m²	1.500 m²		
Solar and secondary flows	26,2 m³/h	32,6 m³/h		
Fluid speed	1,45 m/s	1,8 m/s		
Exchange power	919 kW	1.140 kW		
DTlog heat exchanger	5°K	5°K		
Expansion volume	600 liters	3.000 liters		
Overtank volume	3.000 liters	6.000 liters		
Dimensions	Base = 40' container	Ref. 113001	Base = 40' container	Ref. 113002

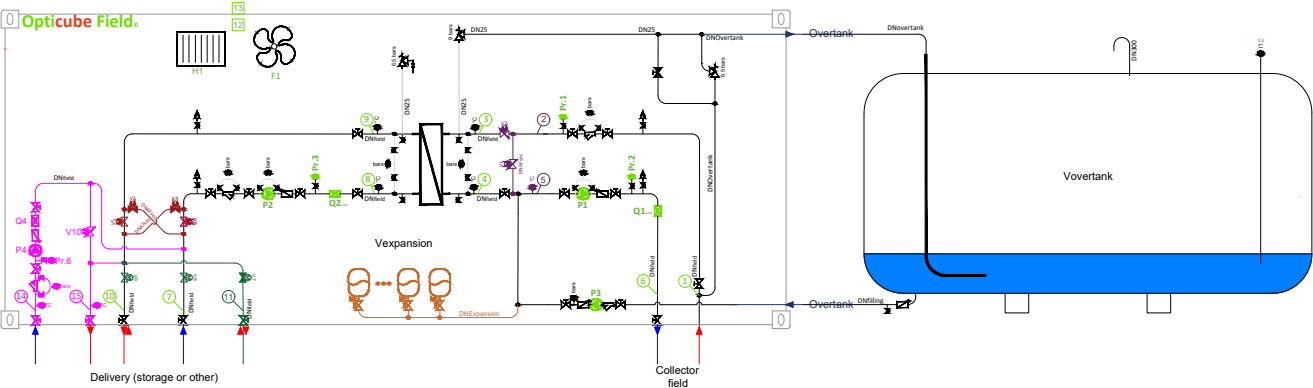
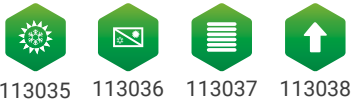
Available options



DN100 «Liquid»	Standard size...	...up to		
Solar surface	2.250 m²	2.770 m²		
Solar and secondary flows	48,1 m³/h	59,4 m³/h		
Fluid speed	1,7 m/s	2,1 m/s		
Exchange power	1.683 kW	2.078 kW		
DTlog heat exchanger	5°K	5°K		
Expansion volume	1.000 liters	5.000 liters		
Volule Overtank	6.000 liters	10.000 liters (external Overtank)		
Dimensions	Base = 40' container	Ref. 113003	Base = 40' container Overtank 10 m³	Ref. 113004 Ref. 113058

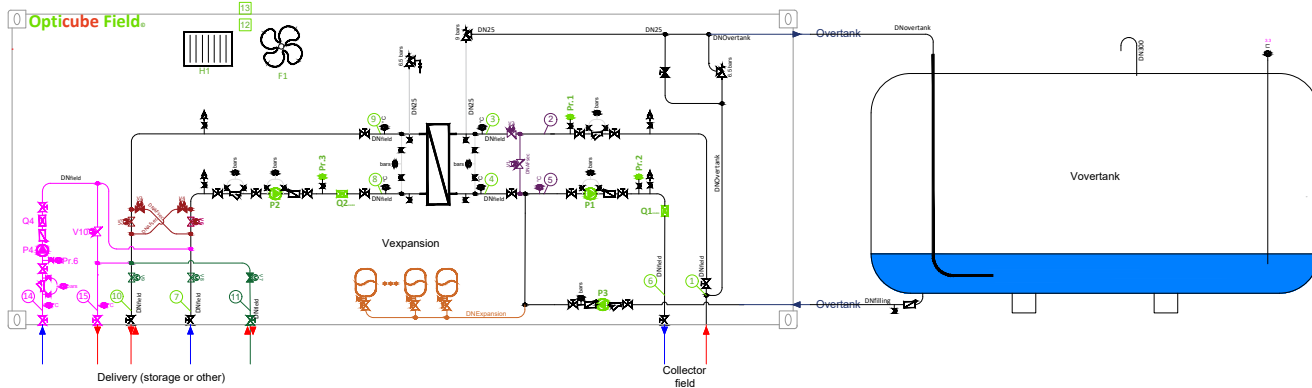


Available options

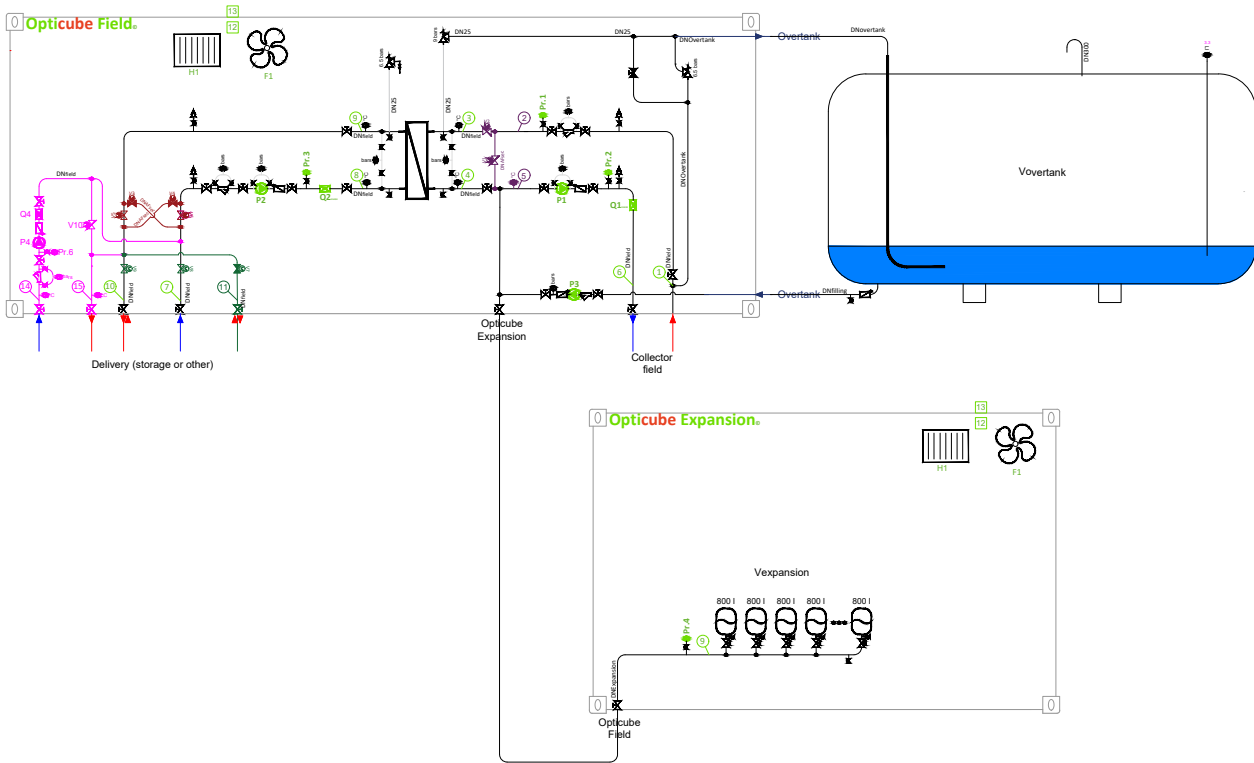


DN125 «Liquid»	Standard size...	...up to		
Solar surface	4.125 m²		5.000 m²	
Solar and secondary flows	88,4 m³/h		106,0 m³/h	
Fluid speed	2 m/s		2,4 m/s	
Exchange power	3.093 kW		3.711 kW	
DTlog heat exchanger	5°K		5°K	
Expansion volume	2.000 liters		5.000 liters	
Overtank volume	20 m³ (external Overtank)		40 m³ (external Overtank)	
Dimensions	Base = 40' container Overtank 20 m³	Ref. 113005 Ref. 113059	Base = 40' container Overtank 40 m³	Ref. 113006 Ref. 113060

Available options



DN150 «Liquid»	Standard size...	...up to		
Solar surface	5.950 m²		7.125 m²	
Solar and secondary flows	127,2 m³/h		152,7 m³/h	
Fluid speed	2 m/s		2,4 m/s	
Exchange power	4.453 kW		5.344 kW	
DTlog heat exchanger	5°K		5°K	
Expansion volume	3.000 liters		5.600 liters (external expansion)	
Overtank volume	20 m³ (external Overtank)		40 m³ (external Overtank)	
Dimensions	Base = 40' container Overtank 20 m³	Ref. 113007 Ref. 113059	1 Base = 40' container Expansion = 20' container Overtank 40 m³	Ref. 113008 Ref. 113065 Ref. 113060



OPTICUBE FIELD - DN200

FROM 7.000 TO 13.000 M²

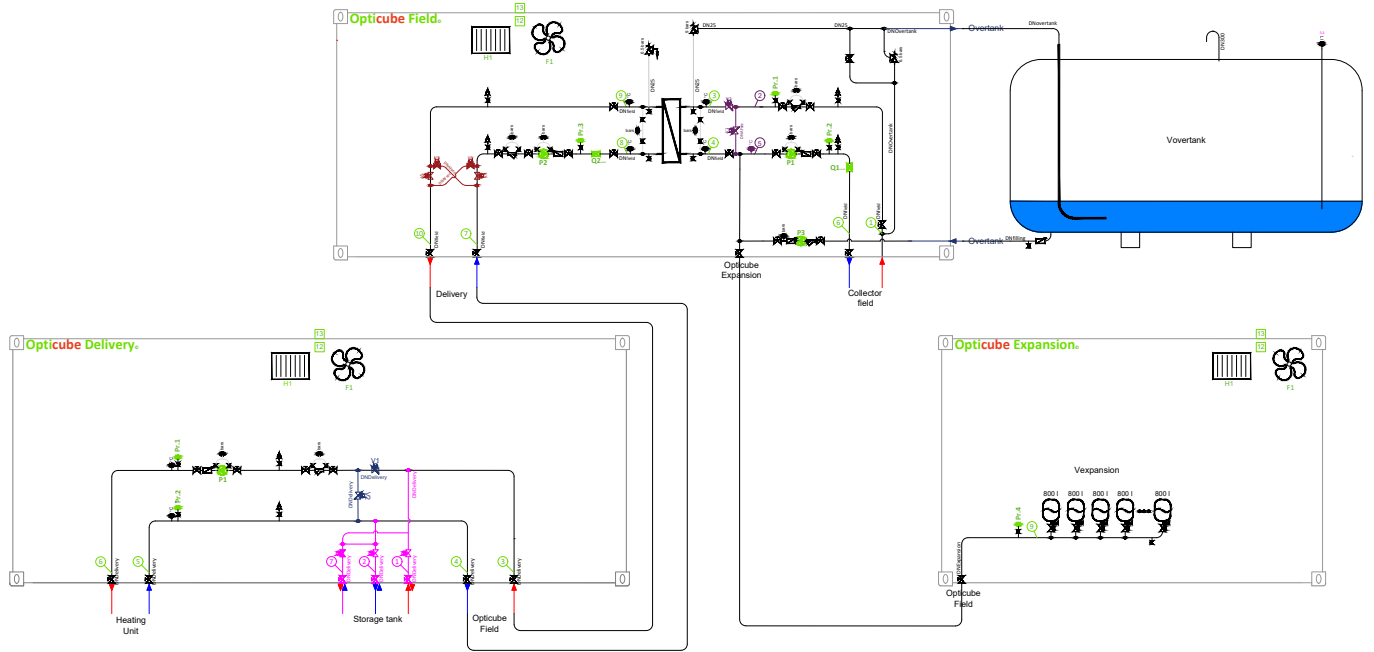
Available options


113043


113044


113045
113047*

*The stratification option is available for the Opticube Field DN200 (113045). If the customer decides to install an additional Opticube Delivery, the stratification option is placed in the Delivery container (113047).




DN200 «Liquid»	Standard size...		...up to	
Solar surface	10.556 m²		12.750 m²	
Solar and secondary flows	226,2 m³/h		271,4 m³/h	
Fluid speed	2 m/s		2,4 m/s	
Exchange power	7.916 kW		9.500 kW	
DTlog heat exchanger	5°K		5°K	
Expansion volume	4.000 liters (external expansion)		6.400 liters (external expansion)	
Overtank volume	40 m³ (external Overtank)		65 m³ (external Overtank)	
Dimensions	Base = 40' container Delivery = 40' container Expansion = 20' container Overtank 40 m³	Ref. 113009 Ref. 113046 Ref. 113063 Ref. 113060	Base = 40' container Delivery = 40' container Expansion = 20' container Overtank 65 m³	Ref. 113010 Ref. 113046 Ref. 113066 Ref. 113061


OPTICUBE FIELD - DN250

FROM 13.000 TO 20.000 M²

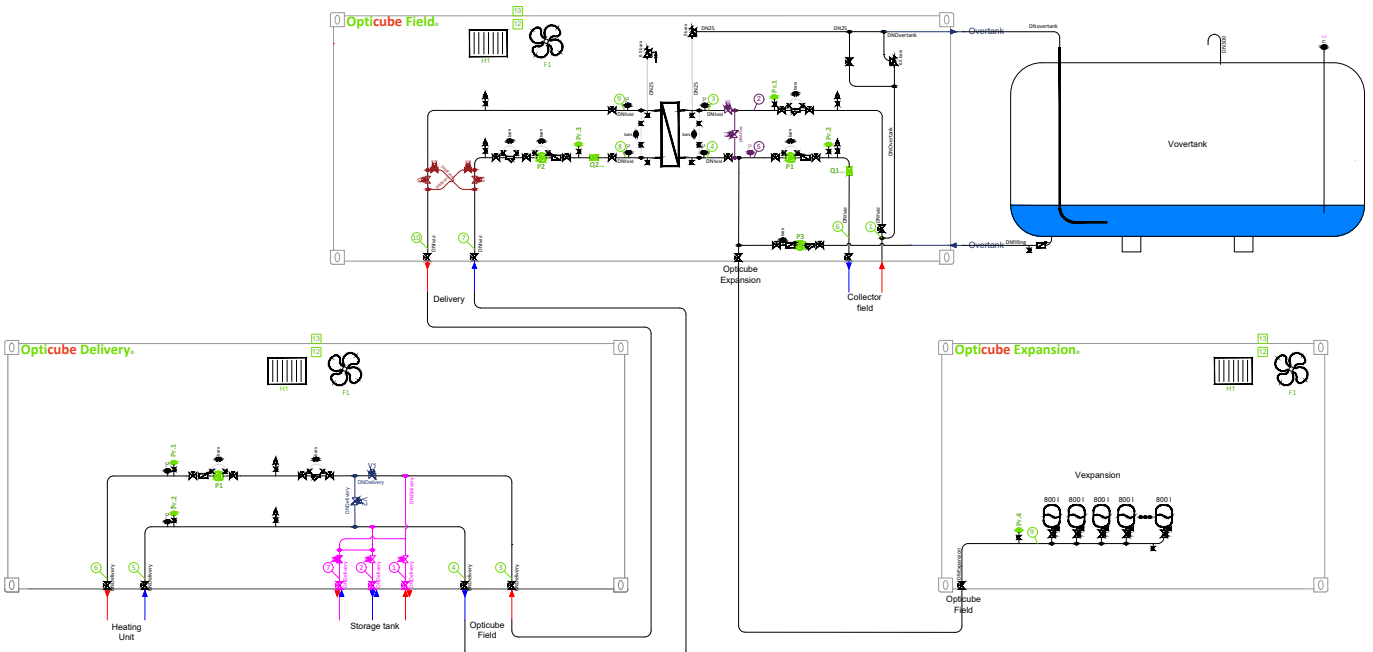
Available options


113048


113049


113050
113052*


*The stratification option is available for the Opticube Field DN250 (113049). If the customer decides to install an additional Opticube Delivery, the lamination option is placed in the Delivery container (113052).



DN250 «Liquid»	Standard size...		...up to	
Solar surface	16.500 m²		19.800 m²	
Solar and secondary flows	353,5 m³/h		424,1 m³/h	
Fluid speed	2 m/s		2,4 m/s	
Exchange power	12.370 kW		14.844 kW	
DTlog heat exchanger	5°K		5°K	
Expansion volume	8.000 liters (external expansion)		11,2 m³ (external expansion)	
Overtank volume	65 m³ (external Overtank)		100 m³ (external Overtank)	
Dimensions	Base = 40' container Delivery = 40' container Expansion = 20' container Overtank 65 m³	Ref. 113011 Ref. 113051 Ref. 113068 Ref. 113061	Base = 40' container Delivery = 40' container Expansion = 20' container Overtank 100 m³	Ref. 113012 Ref. 113051 Ref. 113072 Ref. 113062

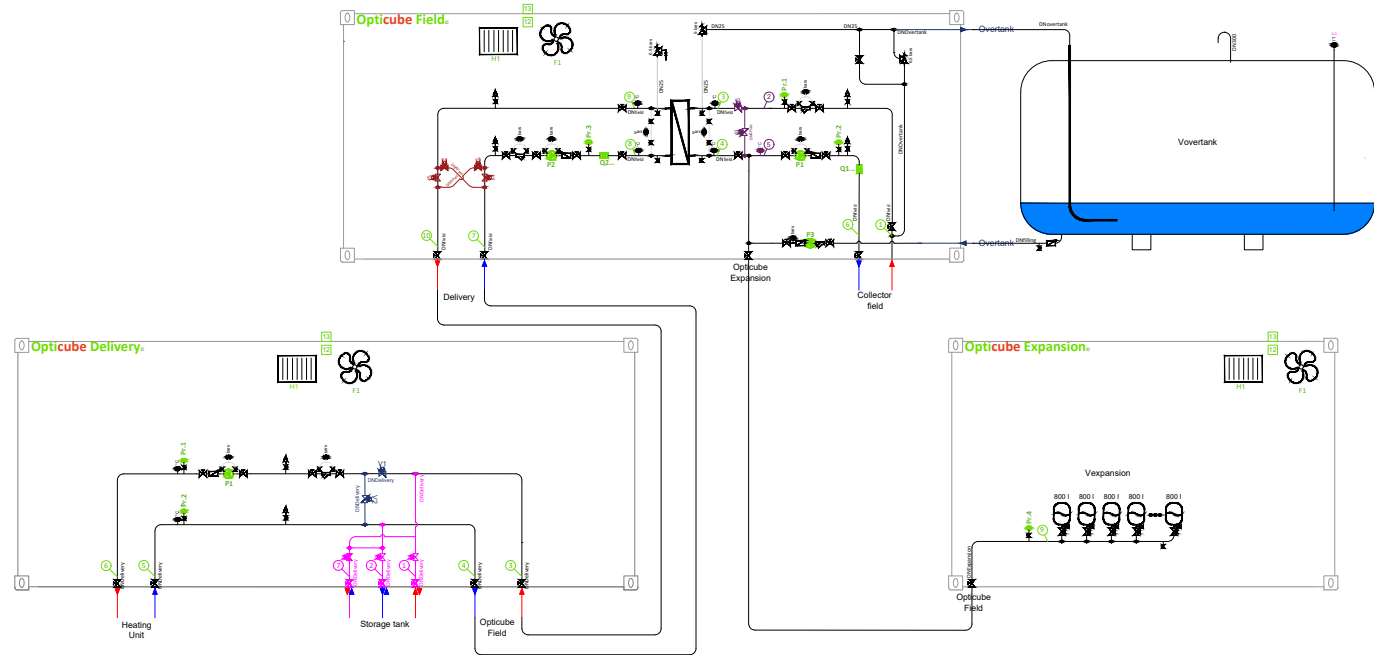
Available options


113053


113054


113055
113057*

*The stratification option is available for the Opticube Field DN300 (113055). If the customer decides to install an additional Opticube Delivery, the stratification option is placed in the Delivery container (113057).



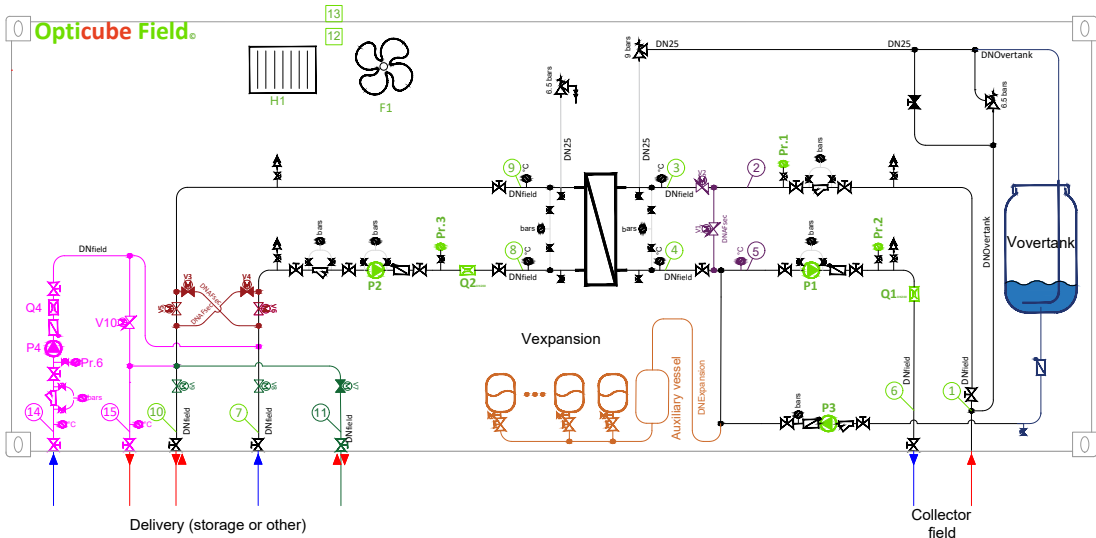
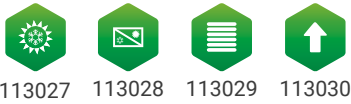
DN300 «Liquid»	Standard size...		...up to	
Solar surface	23.750 m²		29.700 m²	
Solar and secondary flows	508,9 m³/h		636,2 m³/h	
Fluid speed	2 m/s		2,4 m/s	
Exchange power	17.812 kW		22.266 kW	
DTlog heat exchanger	5°K		5°K	
Expansion volume	8.800 liters (external expansion)		16m³ (external expansion)	
Overtank volume	65 m³ (external Overtank)		100 m³ (external Overtank)	
Dimensions	Base = 40' container Delivery = 40' container Expansion = 20' container Overtank 65 m³	Ref. 113013 Ref. 113056 Ref. 113069 Ref. 113061	Base = 40' container Delivery = 40' container Expansion = 40' container Overtank 110 m³	Ref. 113014 Ref. 113056 Ref. 113078 Ref. 113062



FULL RANGE

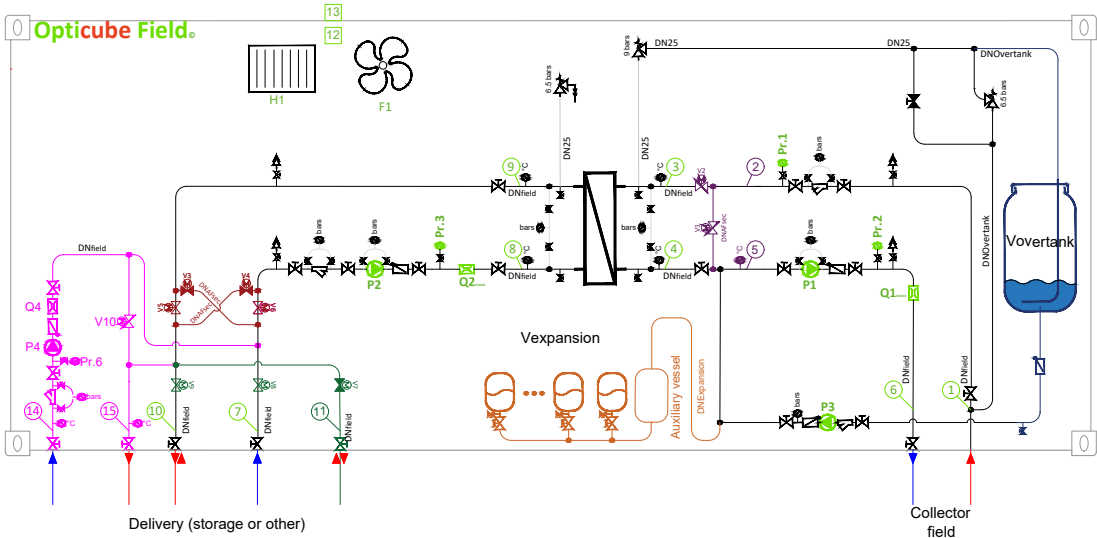
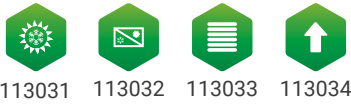
«STEAM» PHILOSOPHY

Available options

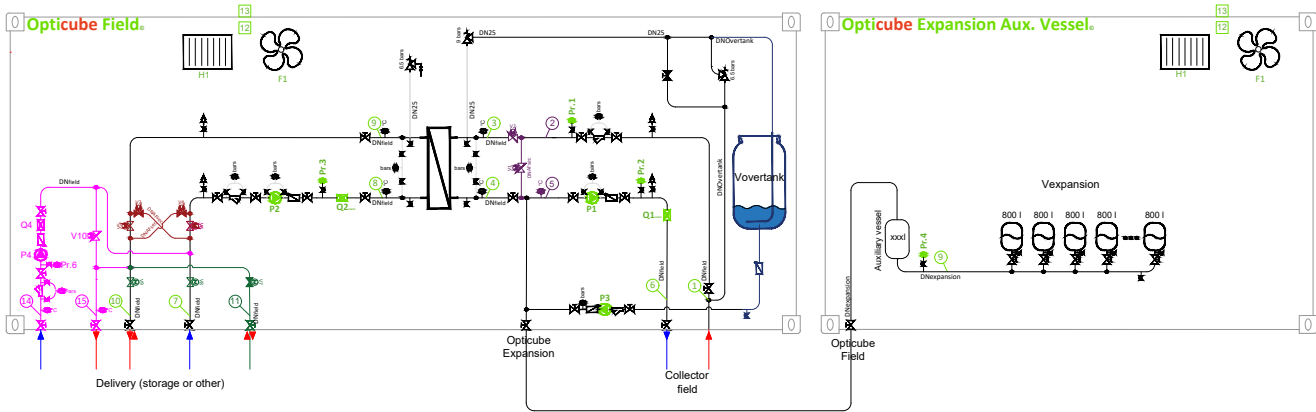


DN80 «Steam»	Standard size...	...up to
Solar surface	1.220 m²	1.500 m²
Solar and secondary flows	26,2 m³/h	32,6 m³/h
Fluid speed	1,45 m/s	1,8 m/s
Exchange power	919 kW	1.140 kW
DTlog heat exchanger	5°K	5°K
Auxiliary vessel volume	1.000 liters	1.500 liters
Expansion volume	2.000 liters	5.000 liters
Overtank volume	1.500 liters	3.000 liters
Dimensions	Base = 40' container	Ref. 113015 Base = 40' container Ref. 113016

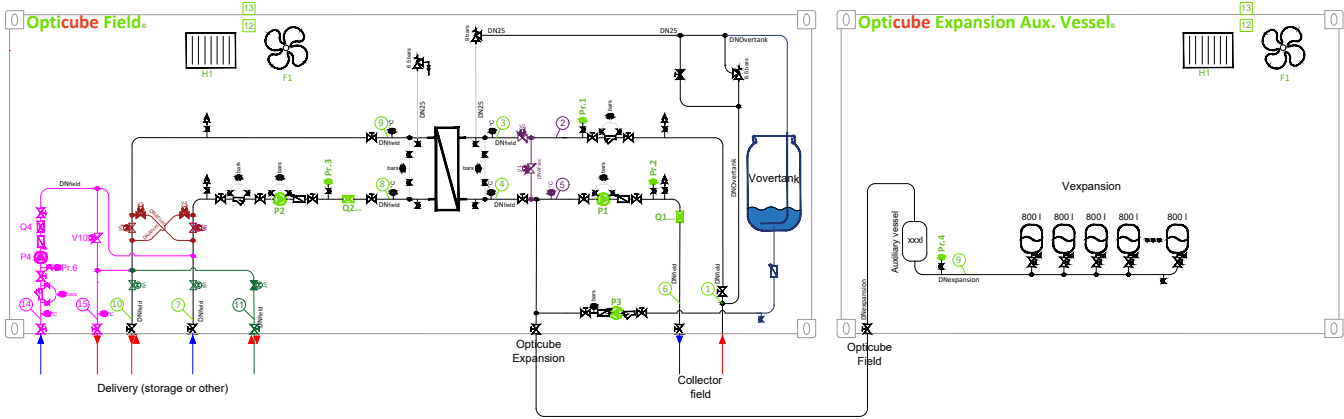
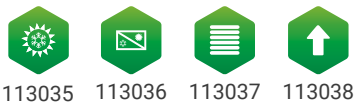
Available options



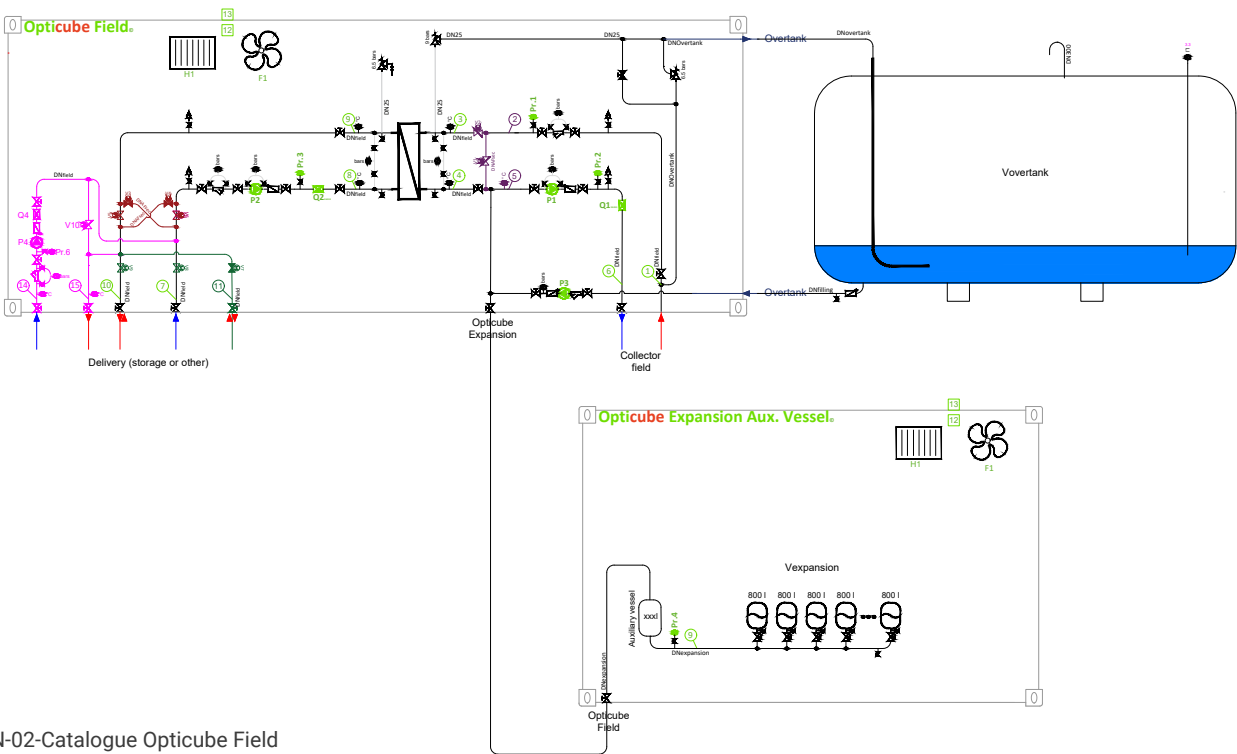
DN100 «Steam»	Standard size...	...up to
Solar surface	2.250 m²	2.770 m²
Solar and secondary flows	48,1 m³/h	59,4 m³/h
Fluid speed	1,7 m/s	2,1 m/s
Exchange power	1.683 kW	2.078 kW
DTlog heat exchanger	5°K	5°K
Auxiliary vessel volume	2.000 liters	3.000 liters (external expansion)
Expansion volume	4.000 liters	8.000 liters (external expansion)
Overtank volume	2.000 liters	6.000 liters
Dimensions	Base = 40' container	Ref. 113017 Base = 40' container Expansion = 20' container Ref. 113018 Ref. 113090



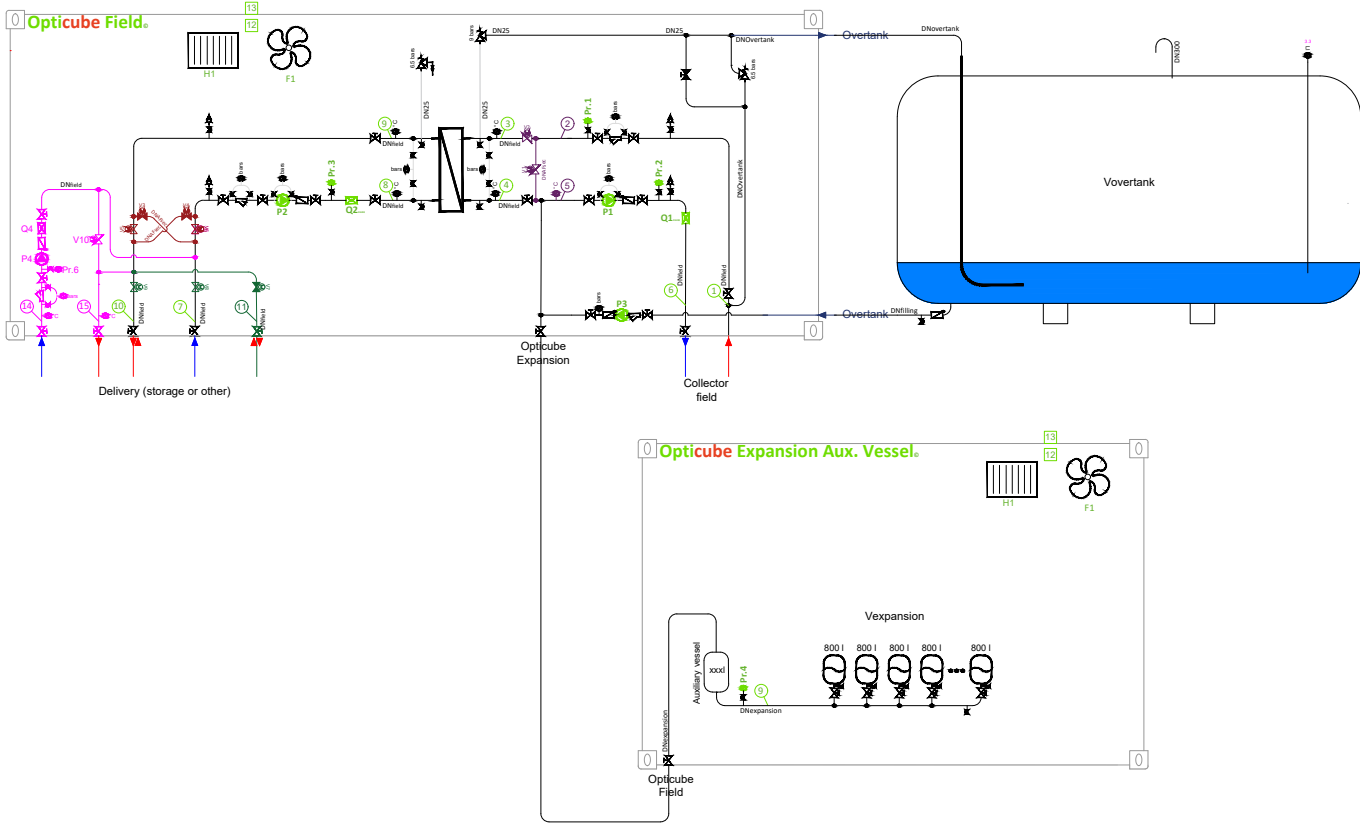
Available options



DN125 «Steam»	Standard size...		...up to	
Solar surface	4.125 m²		5.000 m²	
Solar and secondary flows	88,4 m³/h		106,0 m³/h	
Fluid speed	2 m/s		2,4 m/s	
Exchange power	3.093 kW		3.711 kW	
DTlog heat exchanger	5°K		5°K	
Auxiliary vessel volume	3.000 liters (external expansion)		6.000 liters (external expansion)	
Expansion volume	7.200 liters (external expansion)		16 m³ (external expansion)	
Overtank volume	6.000 liters		10 m³ (external Overtank)	
Dimensions	Base = 40' container Expansion = 20' container	Ref. 113019 Ref. 113089	Base = 40' container Expansion = 40' container Overtank 10 m³	Ref. 113020 Ref. 113092 Ref. 113058



Available options



DN150 «Steam»	Standard size...		...up to	
Solar surface	5.950 m²		7.125 m²	
Solar and secondary flows	127,2 m³/h		152,7 m³/h	
Fluid speed	2 m/s		2,4 m/s	
Exchange power	4.453 kW		5.344 kW	
DTlog heat exchanger	5°K		5°K	
Auxiliary vessel volume	4.000 liters (external expansion)		9.000 liters (external expansion)	
Expansion volume	10,4 m³ (external expansion)		16 m³ (external expansion)	
Overtank volume	10 m³ (external Overtank)		20 m³ (external Overtank)	
Dimensions	Base = 40' container Expansion = 40' container Overtank 10 m³	Ref. 113021 Ref. 113091 Ref. 113058	Base = 40' container Expansion = 40' container Overtank 20 m³	Ref. 113022 Ref. 113094 Ref. 113059

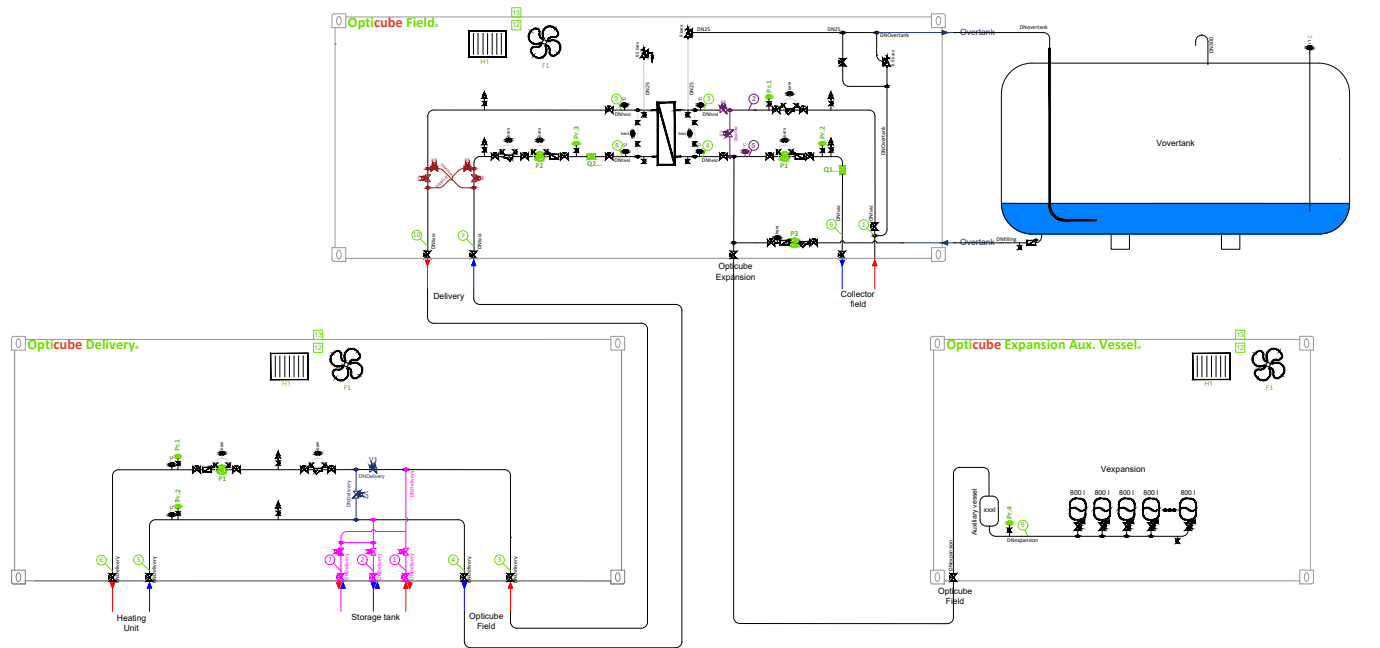
OPTICUBE FIELD - DN200

FROM 7.000 TO 13.000 M²

Available options



*The stratification option is available for the Opticube Field DN200 (113045). If the customer decides to install an additional Opticube Delivery, the stratification option is placed in the Delivery container (113047).

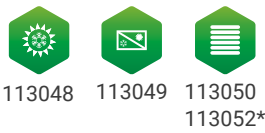


DN200 «Steam»	Standard size...		...up to	
Solar surface	10.556 m²		12.750 m²	
Solar and secondary flows	226,2 m³/h		271,4 m³/h	
Fluid speed	2 m/s		2,4 m/s	
Exchange power	7.916 kW		9.500 kW	
DTlog heat exchanger	5°K		5°K	
Auxiliary vessel volume	6.000 liters (external expansion)		9.000 liters (external expansion)	
Expansion volume	18 m³ (external expansion)		36 m³ (external expansion)	
Overtank volume	40 m³ (external Overtank)		65 m³ (external Overtank)	
Dimensions	Base = 40' container Delivery = 40' container Expansion = 40' container Overtank 40 m³	Ref. 113023 Ref. 113046 Ref. 113093 Ref. 113060	Base = 40' container Expansion = 40' container Delivery = 40' container Expansion 24 m³ = 40' container Overtank 65 m³	Ref. 113024 Ref. 113095 Ref. 113046 Ref. 113098 Ref. 113061

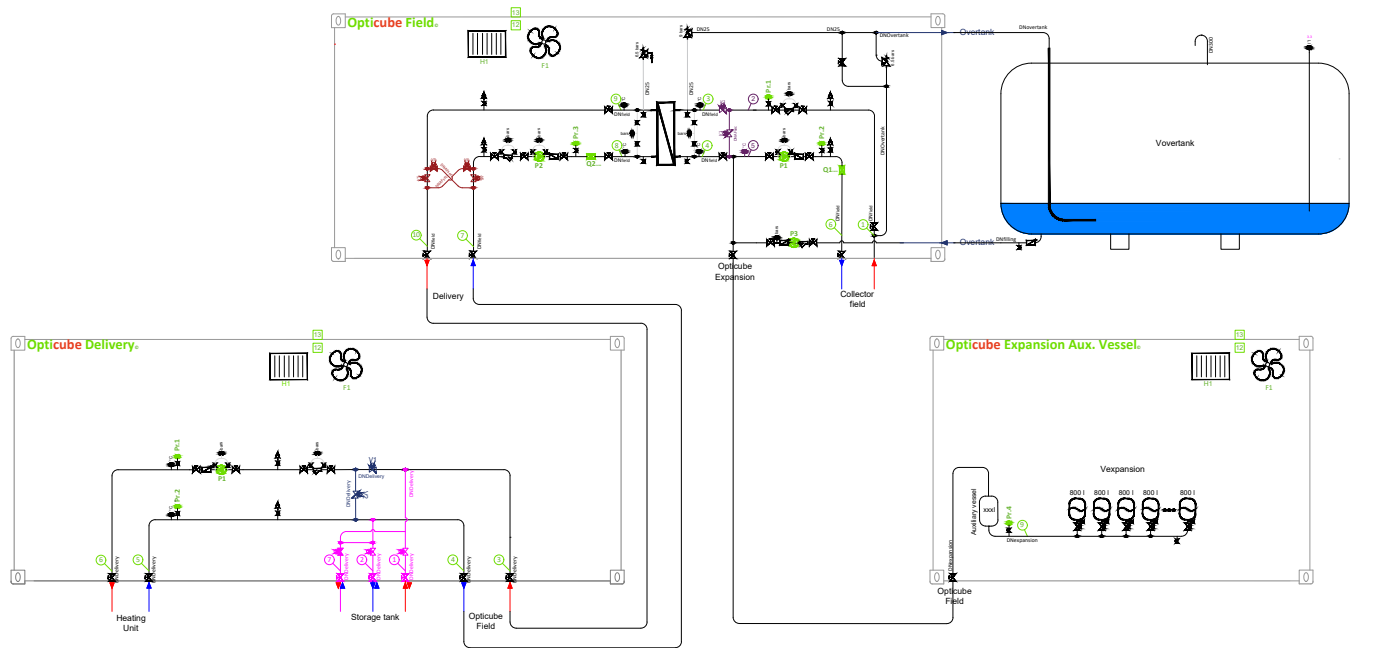
OPTICUBE FIELD - DN250

FROM 13.000 TO 20.000 M²

Available options



*The stratification option is available for the Opticube Field DN250 (113049). If the customer decides to install an additional Opticube Delivery, the lamination option is placed in the Delivery container (113052).



DN250 «Steam»	Standard size...		...up to	
Solar surface	16.500 m²		19.800 m²	
Solar and secondary flows	353,5 m³/h		424,1 m³/h	
Fluid speed	2 m/s		2,4 m/s	
Exchange power	12.370 kW		14.844 kW	
DTlog heat exchanger	5°K		5°K	
Auxiliary vessel volume	10 m³ (external expansion)		12 m³ (external expansion)	
Expansion volume	28 m³ (external expansion)		56 m³ (external expansion)	
Overtank volume	65 m³ (external Overtank)		100 m³ (external Overtank)	
Dimensions	Base = 40' container Delivery = 40' container Expansion = 40' container Overtank 65 m³	Ref. 113025 Ref. 113051 Ref. 113096 Ref. 113061	Base = 40' container Expansion = 40' container Delivery = 40' container 2 x Expansion 24 m³ = 40' container Overtank 100 m³	Ref. 113026 Ref. 113097 Ref. 113051 Ref. 113098 Ref. 113062



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