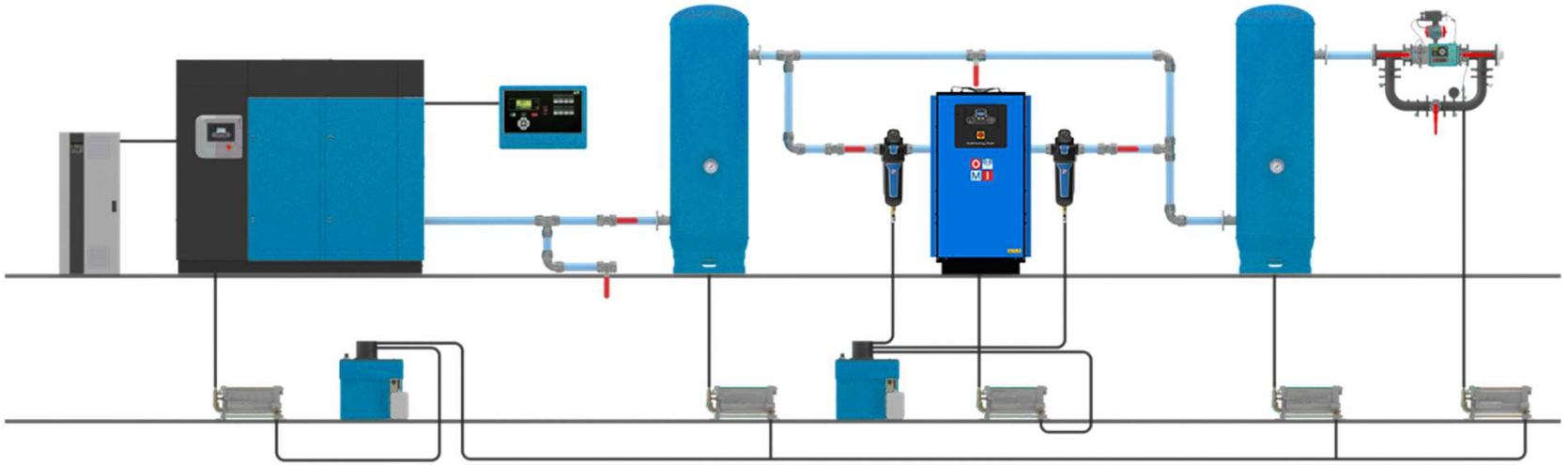
WEBINAR OMI

Sub-Freezing Dryer - SFD

Table of Contents

Compressed Air Treatment

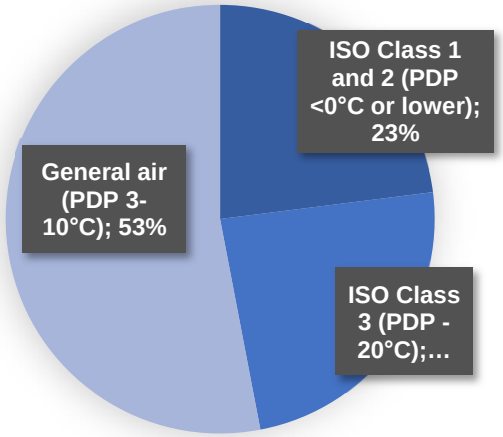


- Air Dryer removes contaminates, improves productivity, system efficiency and product/process quality
- Leak-free, low pressure drop EPL Piping
- Drain valves remove contaminates from the system without losing compressed air (manual, floating, time-based, capcitive, NO-LOSS)
- Flow and system controllers for compressed air optimization
- Filtration products censure clean air and improve productivity
- Oil Water separators remove lubricant from compressed air condensate for and environmentally friendly disposal

NEW

Class 3 ISO Applications

Recommended standards for a High Air Quality		
High Air Quality Applications	**Class 3 ISO 8573-1**	**Dew point**
Air shaking	3	-20° C
Air-cushion	3	-20° C
Air measurement	3	-20° C
Pneumatic transport of granular	3	-20° C
Food/beverage (no direct contact)	3	-20° C
Packaging and texile machinery	3	-20° C
Air for measuring instruments	3	-20° C
Blasting	3	-20° C
External piping for cold environments	3	-20° C
Pneumatic transport of powder products	2	-40° C
Fluidic, sensors	2	-40° C
Food/beverage (direct contact)	2	-40° C
Microelectronic production	1	-70° C
Processing of photografic film	1	-70° C



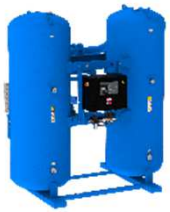
Dryers Portfolio

What kind of dryer are we referring to?

Aspects to consider
- Applications?
- Environmental conditions?
- Energetic/Maintenance cost?
- Competitors?

Standard refrigerated Dryer

HOC



Adsorption Dryer

Categories of dryers
- General purpose – PDP above 0˚ C
- High air quality – PDP below 0˚ C

Several kinds in each category, why?
- Total Cost of Ownership (TCO) vs Purchase price

Current High Air Quality – Adsorption dryers/ regenerative
- Heatless dessicant dryer – Low Price / High TCO
- Heated dessicant dryer– Medium Price / Medium TCO
- Heat of compression dryer (HOC) – High Price / Low TCO

SFD Dryer

Coming...**Regenerative Refrigerated Dryers**
Improvement **SFD (Subfreezing) Dryer** – Minimum TCO and competitive price

Sub-zero Dryers Portfolio

What is a Regenerative Refrigerant Dryer?

Think about it as taking the best parts of 3 different types of dryers and merging them into one...

HOC | **Regenerative Dessicant** | **Traditional Refrigerant**

SFD Dryer

- Free Compressor heat for regeneration
- Compatible with all compressor types
- Subfreezing PDP
- Twin Drying Chambers
- No media for drying
- Low maintenance
- Low energy consumption
- ~~*Sensitive to changes*~~
- ~~*Purging*~~
- ~~*Heaters/Blowers*~~
- ~~*Above freezing PDP*~~
- ~~*Large amount of heat energy for regeneration*~~
- ~~*High dBA sound level*~~

What is a Regenerative Refrigerant Dryer?

	Rated Flow* (m3/hr)	Connections	Controller	Height (mm)	Width (mm)	Length (mm)	Rated kW
SFD360-A	360	1-1/2 " BSPT	Xe90D	1670	899	1063	1.46
SFD420-A	420	1-1/2 " BSPT	Xe90D	1670	899	1063	1.78

Standard Features

- R452A refrigerant
- Removable panels for easy service access
- IP42 electrical protection
- Solenoid no-loss drain with feedback to the controller
- Xe90D programmable controller
- Air cooled
- Victaulic® connections for easy maintenance

Optional Features

- IP54 electrical protection
- Low temperature kit (ambient and/or inlet)
- Outdoor modification

***At 7 barg working pressure, 100% RH, Inlet temperature 35° C, Ambient temperature 25 ° C**

SFD Dryer

- ✓ *Is it a regenerative dryer?*
  Yes
- ✓ *Is it an HOC dryer?*
  Yes
- ✓ *Is it a refrigerant dryer?*
  Yes

RIGHTSIZE YOUR DRYER – DOWNSIZE YOUR COST

SFD Dryer
vs Regenerative Adsortion Dryers

- 90% less energy for regeneration
- Nessun mezzo per una durata infinita No medium for an infinite duration
- Designed to endure a minimum Total Cost of Ownership

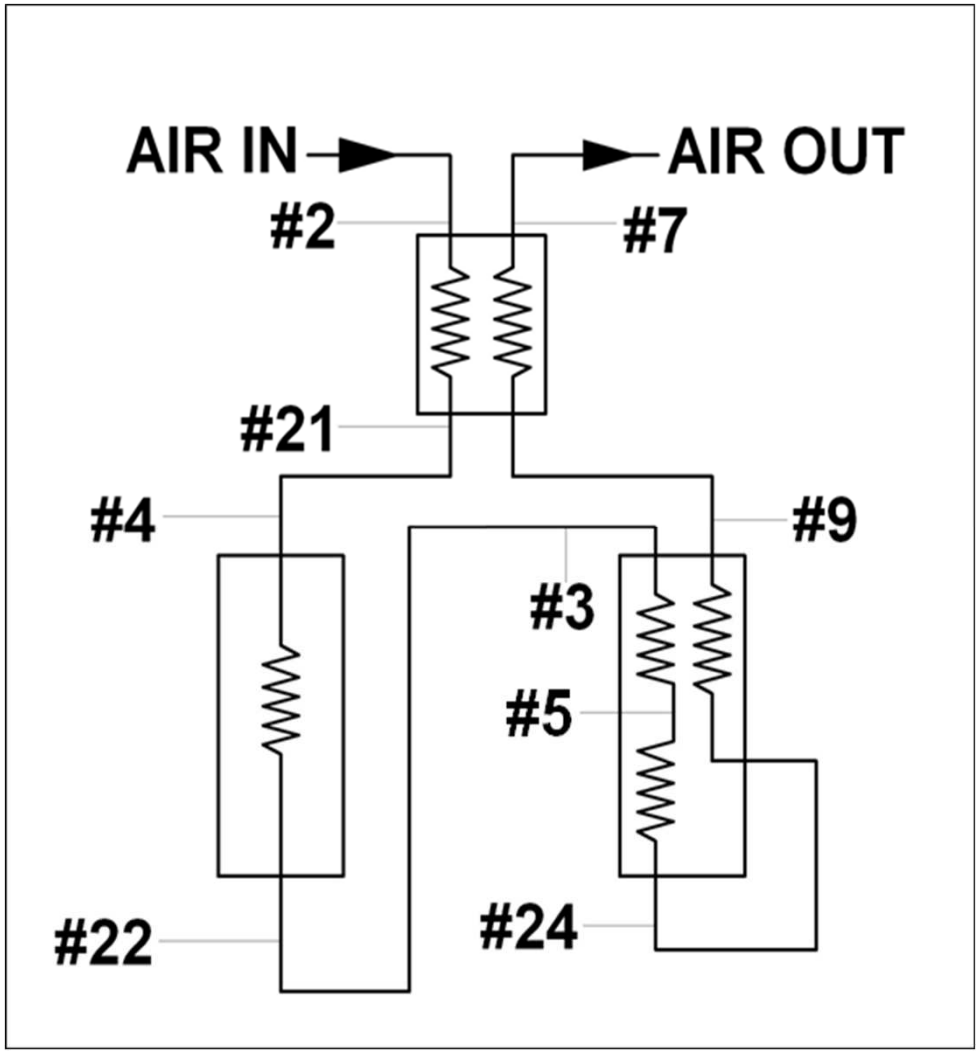
Dryers comparison	SFD	Rigenerato A freddo	Rigenerato A caldo	HOC	Drum
Energy consumption (regeneration phase)	Low	High	High	*High	*High
Energy consumption (regeneration phase)	Medium	Low	Low	Low	Low
Total energetic Cost	Low	High	Medium	Low	Low
Maintenance Cost	Low	Medium	Medium	Medium	High
Total Cost of Ownership	Lower	High	Medium	Medium	Medium
Purchase price	Medium	Low	High	Higher	High
Level of noise	Low	High	Medium-Low	Low	Low
Compatibility with compressors	Oil-free, Lubricated	Oil-free, Lubricated with filters	Oil-free, Lubricated with filters	Oil-free only	Oil-free only

* - The thermal energy needed for the regeneration is extremely high and limits both HOC dryers and a tamburo dryers to oil-free compressors. SFD is the first HOC dryer suitable to be used with lubricated compressors!

SFD Dryer

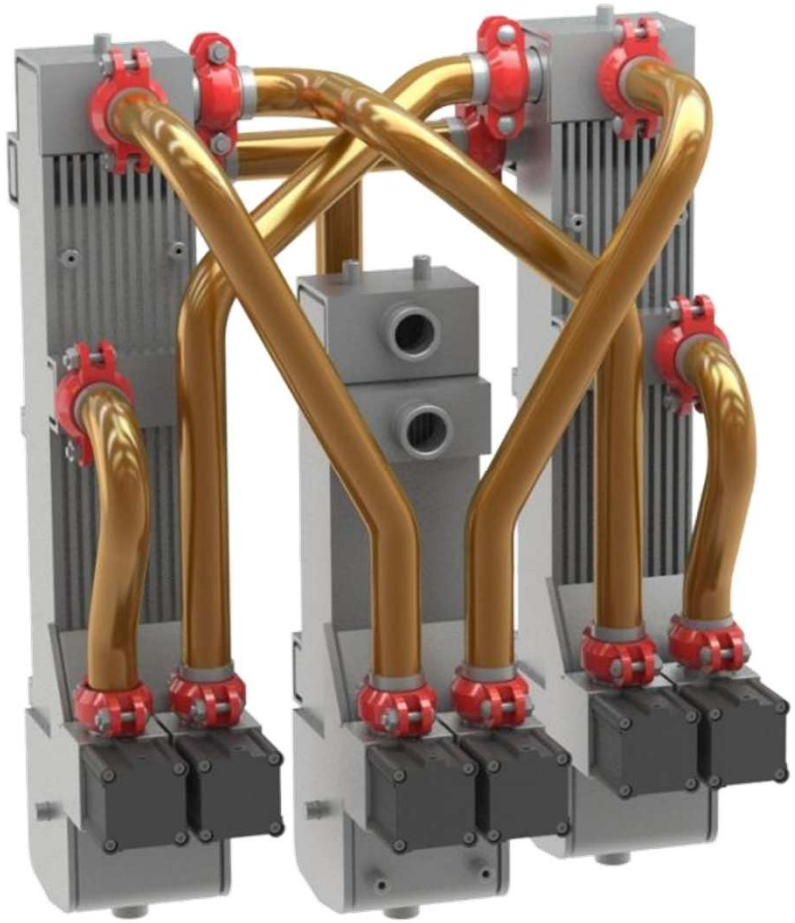
And now, let’s take a step closer to see how the SFD Dryer works

SFD Drying and Refrigerant Circuit



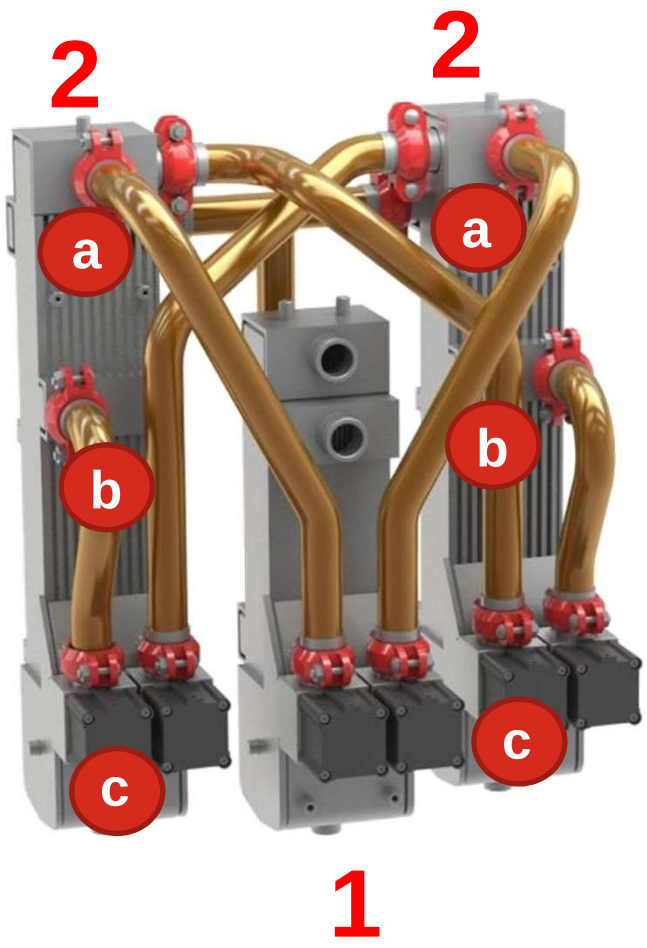
Work Conditions		
Point	T (dry bulb) ° C	T (dew point) ° C
#2	35	35
#21	15	15
#22	3	3
#5	-10	-10
#24	-20	-20
#9	-5	-20
#7	25	-20

SFD Drying and Refrigerating System



Maximize Air-Air Drying – Minimize Energy Cost

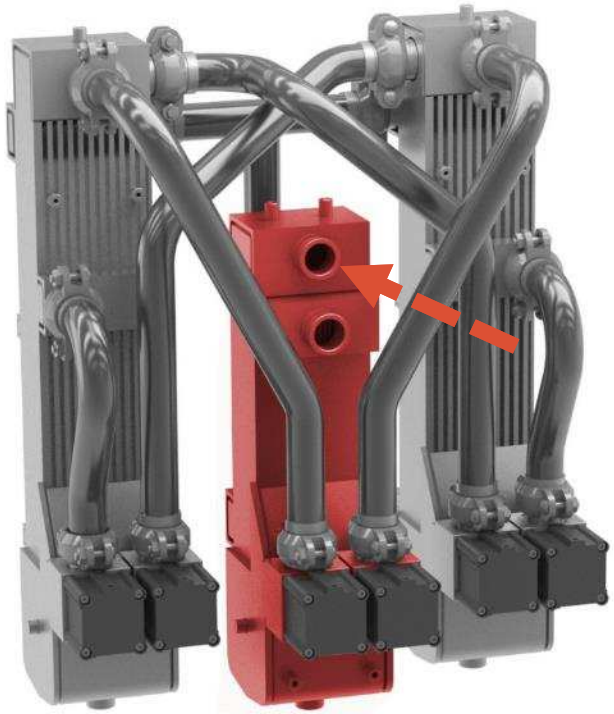
SFD Drying and Refrigerating System



1. Common pre-cooler/ re-heater - air to air heat exchanger
2. 3-in-1 Twin drying chambers
   a) Air-air pre-cooler/ re-heater
   b) Sub-freezing deposition chamber
   c) Moisture separator

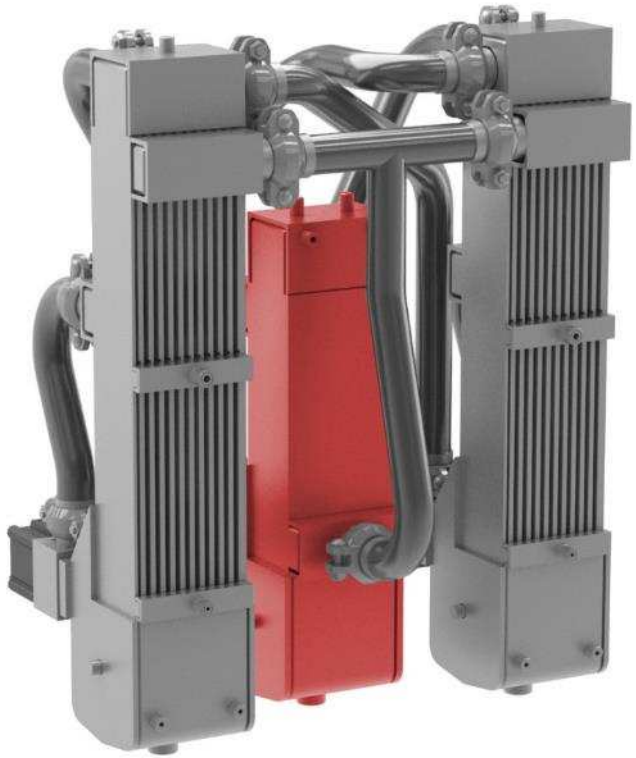
Maximize Air-Air Drying – Minimize Energy Cost

Common pre-cooler
Removes 85% of the moisture from the air



+35° C

+15° C



#2 → #21

Air-Air Drying – NO ENERGY COST

First, we use the heat energy in the air to regenerate one of the twin drying chambers

#21 → #4

Regenerating/ Defrosting – NO ENERGY COST

As the defrost occurs, the air temperature is lowered and dried even more

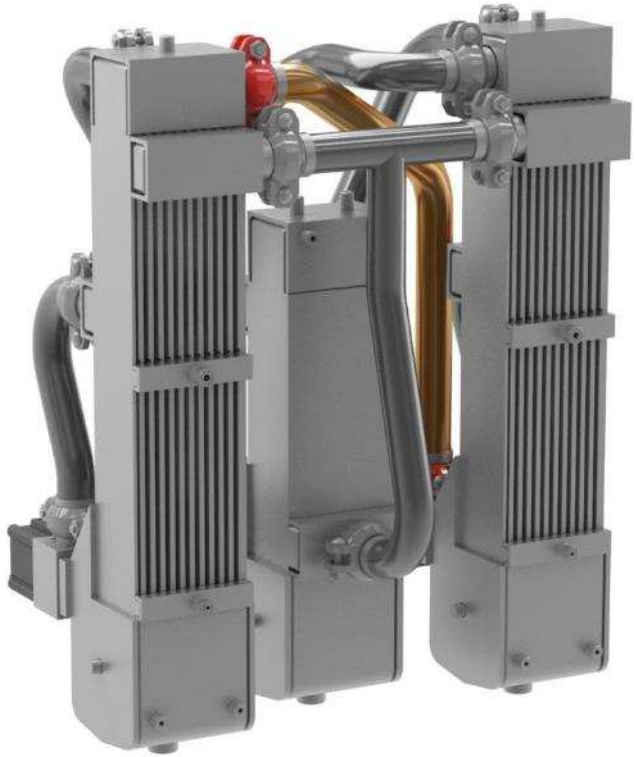
+15° C

+3° C

#4 → #22

Regenerating/ Defrosting – NO ENERGY COST

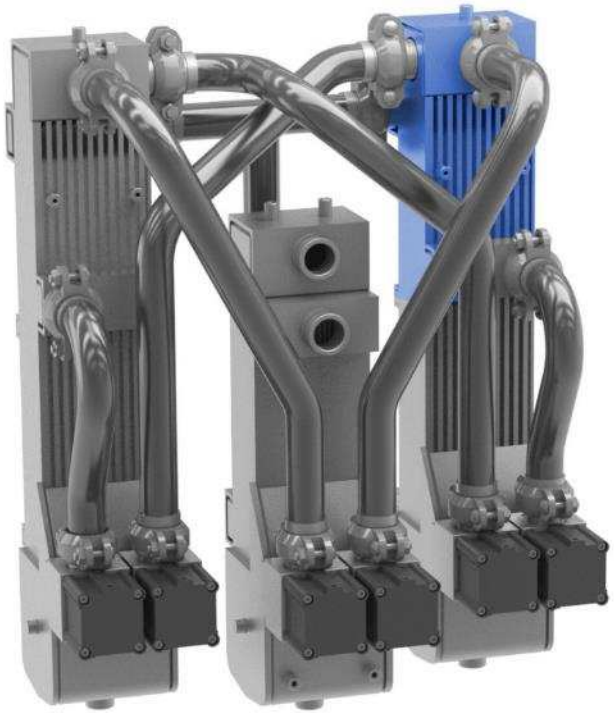
Now the air enters the drying chamber



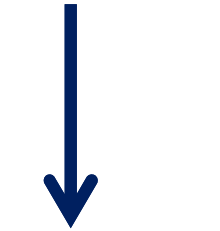
#22 → #3

Air-Air Drying – NO ENERGY COST

Air-Air heat exchanger drops the air temperature below freezing (frosting occurs)



+3° C

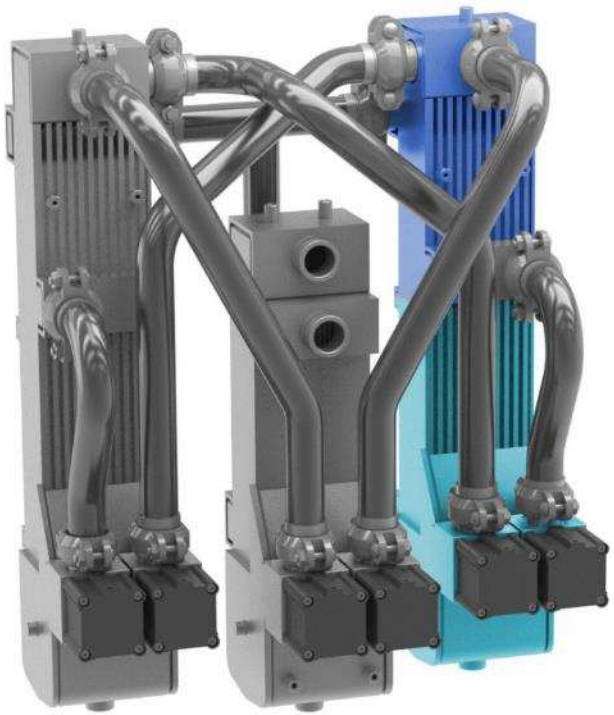


-10° C

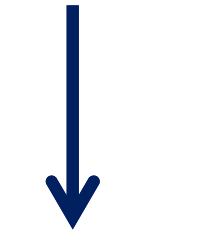
#3 → #5

Air-Air Drying – NO ENERGY COST

Sub-Freezing Deposition chamber
(refrigerant-air heat exchanger)



-10° C

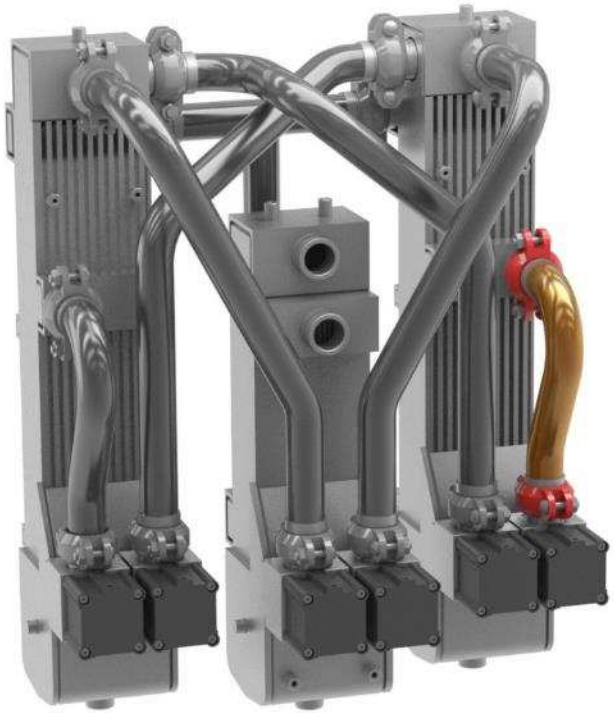


-20° C

#5 → #24

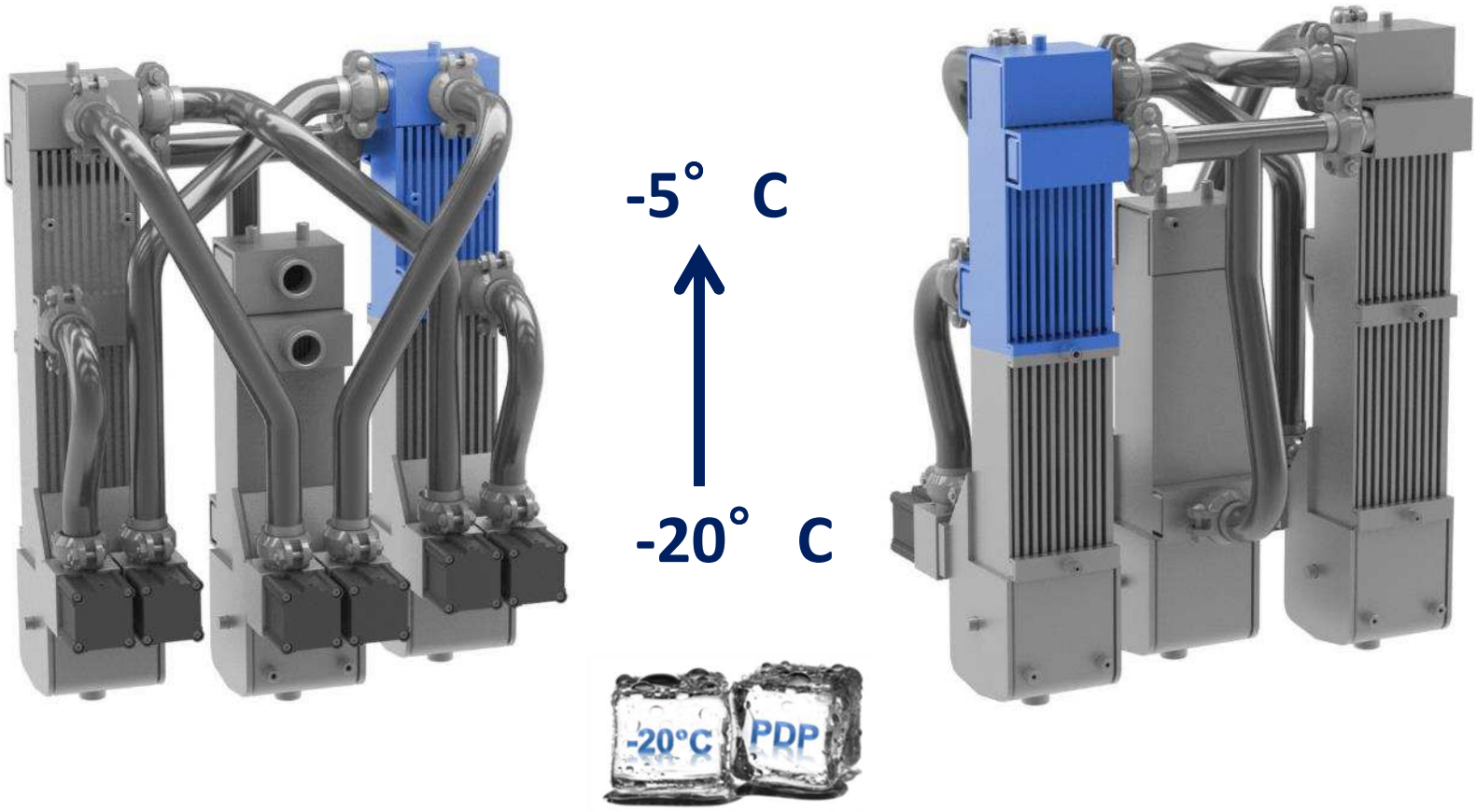
Refrigerant-Air Drying – Minimum Energy Cost

Very dry air at -20˚C PDP! Now air must be re-heated before exiting the SFD dryer



#24

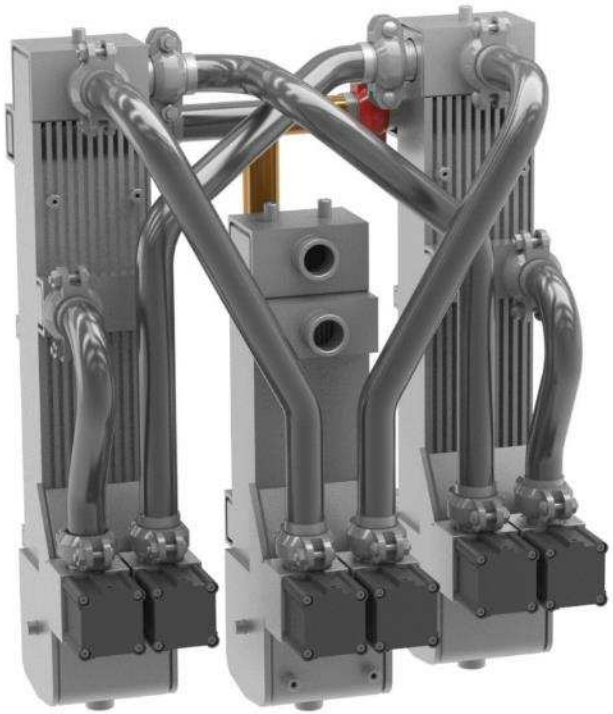
Air to Air heat exchange!
Reheating the air while maintaining a -20° C PDP dryness



#24 → #9

Air-Air Drying – NO ENERGY COST

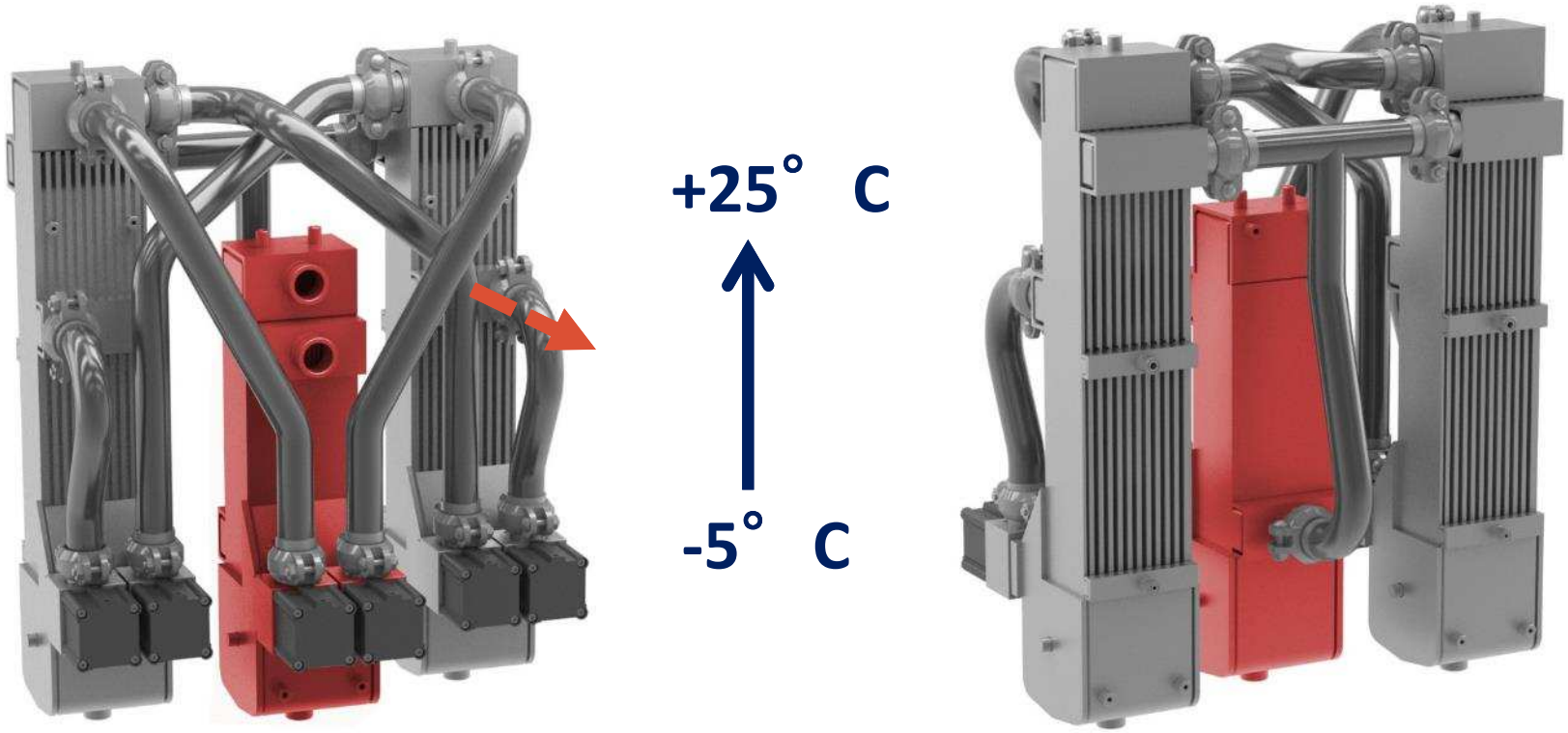
Air re-enters the common pre-cooler



#9

Air-Air Drying – NO ENERGY COST

The air exits the dryer, dried to -20° C PDP and a temperature of +25° C

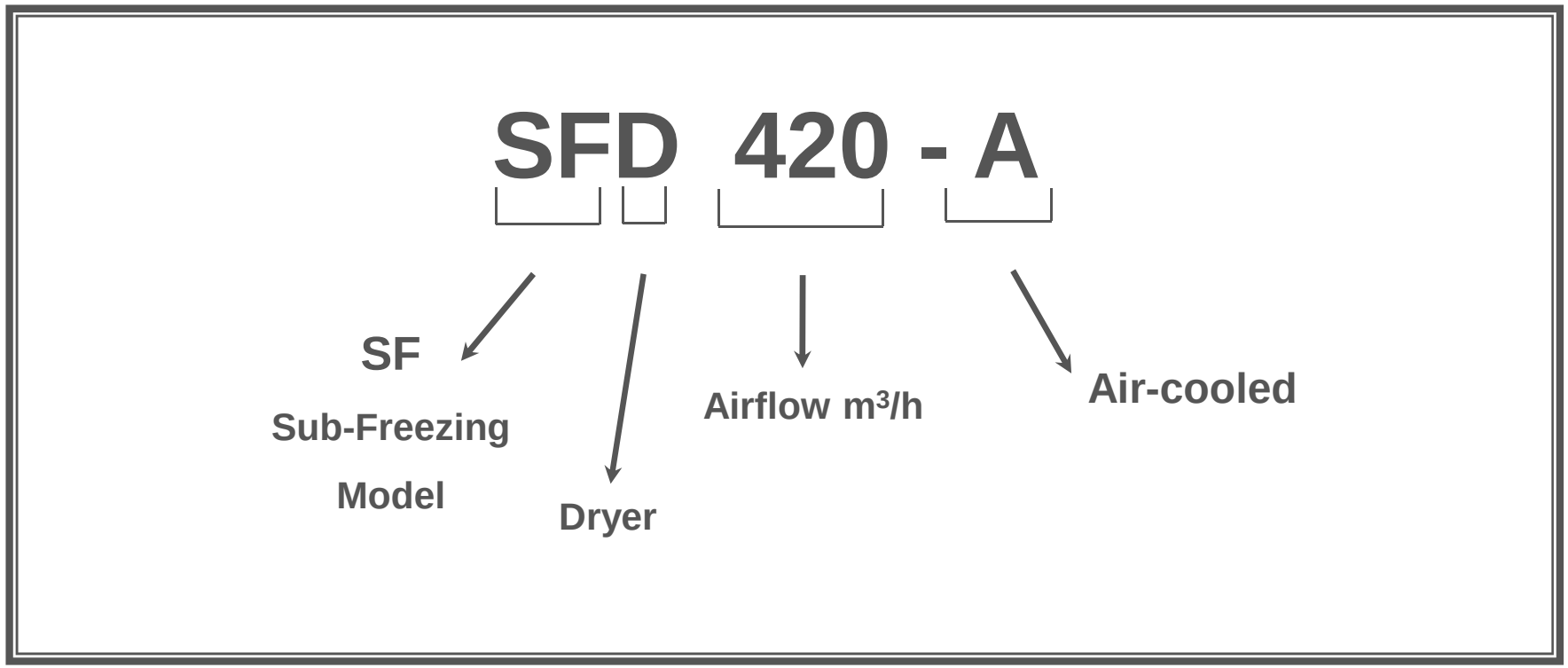


#9 → #7

Air-Air Drying – NO ENERGY COST

Coding

Model denomination – OMI coding procedure



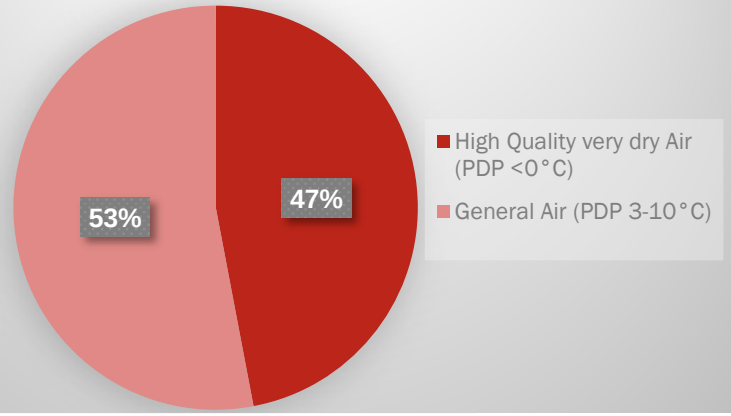
Product Placement

Subfreezing Dryer (SFD)

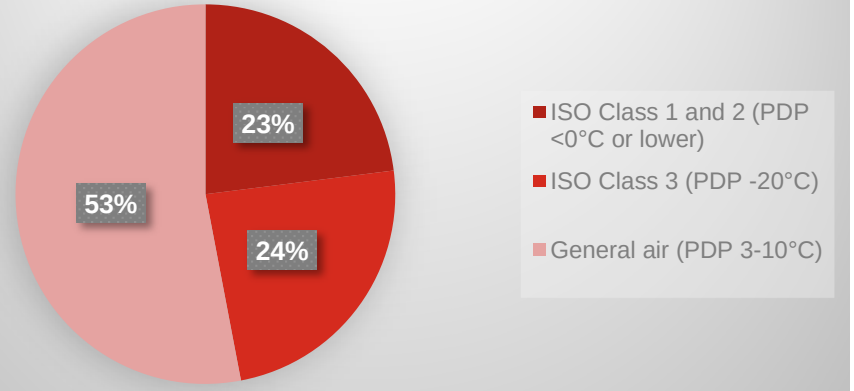
- Unique – no one else has it in his portfolio
- Innovative – patented new technology
- Footprint reduced by 40% compared to a traditional adsortion dryer
- Energetic cost reduced by 70% compared to cooling absoprtion dryer
- Maintenance cost reduced by 80% compared to drum dryers
- More reliable (less sensitive to the load/the environment)
- TCO minimum period – no one can get closer to this result

Business areas

Total market
($ 1,1 billions)

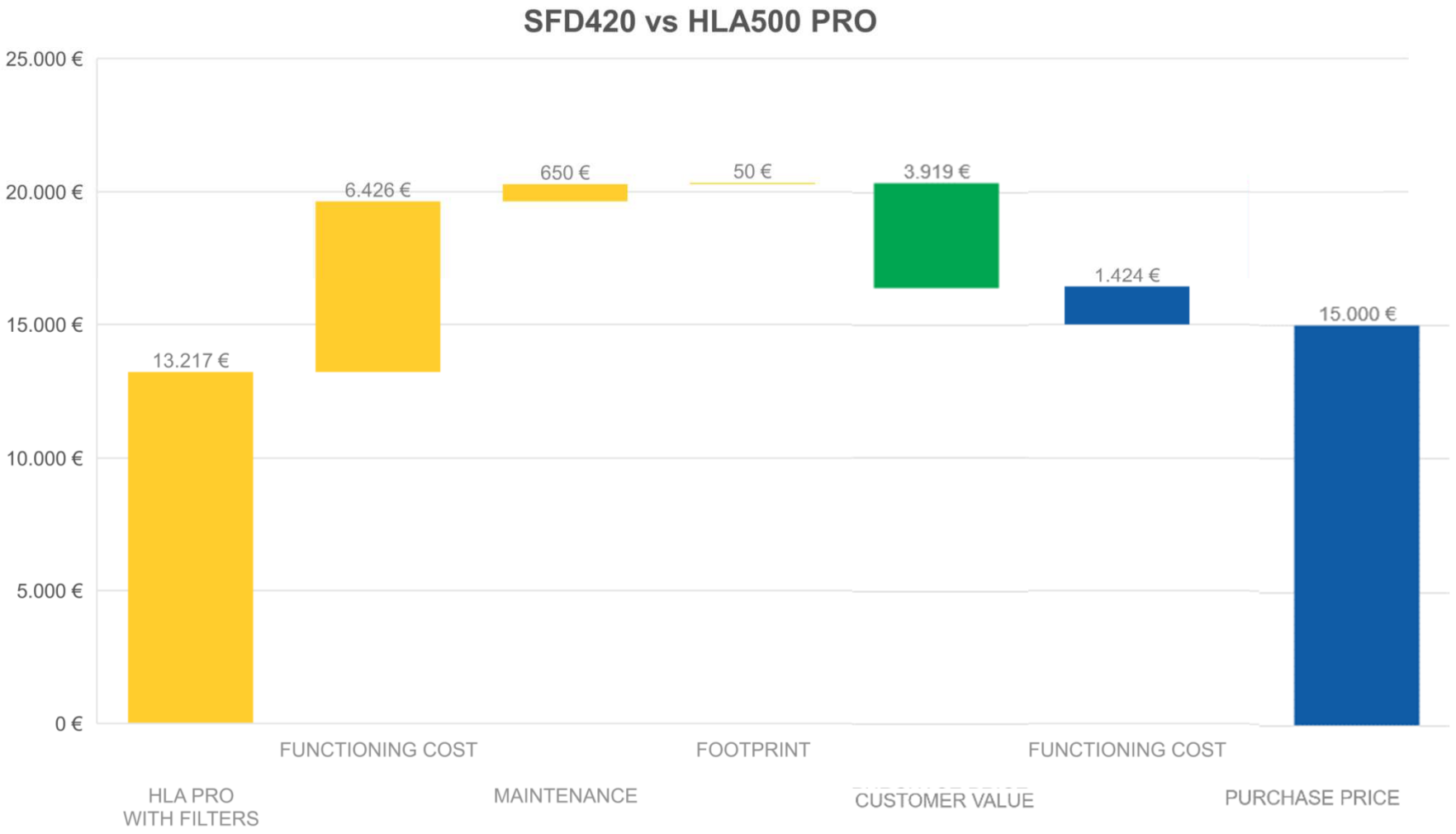


ISO Class 3
($ 288 billions)



Product Value

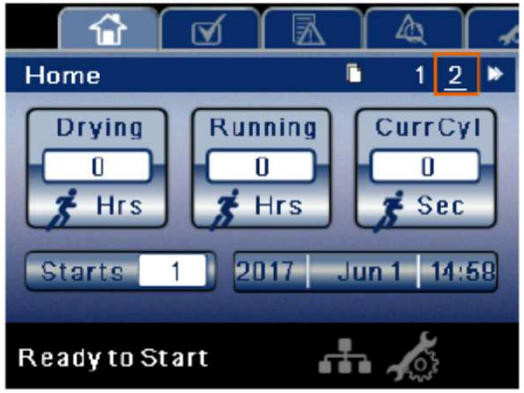
Price analysis
Timing – 2 years
Functioning hours per year – 4.000
kWh rate – 0,10 euro
Medium charge while functioning – 95%

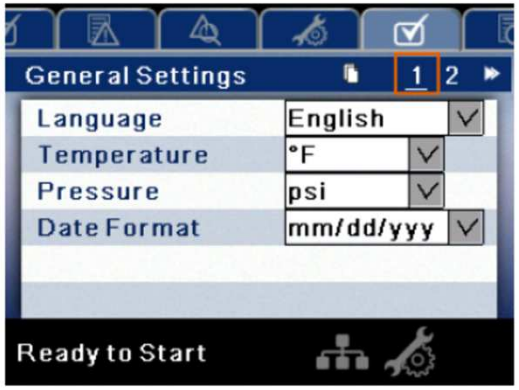


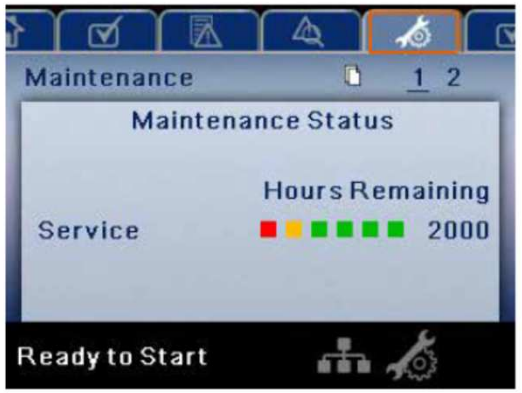
Xe-90D Controller

Xe-90D Controller – Features

- LCD display
- Easy and intuitive
- Icons, pictograms, colorful messages
- Meters (working hours, cycle duration, etc.)
- Last 6 cycles available/ amount of discharge
- 31 available languages and setup your favorite measuring system option
- Remote alarm
- Alarm recording (hour/type)
- Events recording (ignition/shutdown)
- Preventive maintenance (meters counting the hours to next maintenance)







Xe-90D Controller – Features

- Modbus ready (RS-485 e TCP/IP)
- Web-access (through the protocol TCP/IP we can monitor the condition of the dryer)
- SD CARD inside, the controller register data from the last 30 days of work (datalog each range less than 10 seconds)
- 7 temperature probe (HT1 T, HX2 T, PRE T, AIR INLET T, AMBIENT T, MOTO OIL T, SUCTION T)
- 3 pressure transducer (AIR INLET P, AIR OUTLET P, REF P)
- Possibility to install DEW POINT METER (contact OMI)

Options

Low ambient temperature option

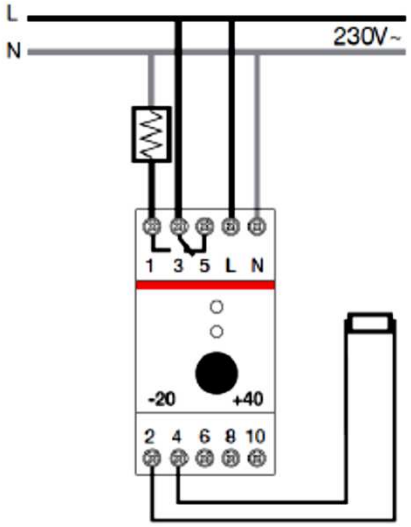
- Electrical Resistance for condensate drain (125 W each)
- Electrical Resistance for control panel (30 W)
- Variable speed fan to stabilize condensation
- Permitted ambient temperature without option: **from + 5 to +45° C**
- Permitted ambient temperature with option: **from -10 to +45° C**

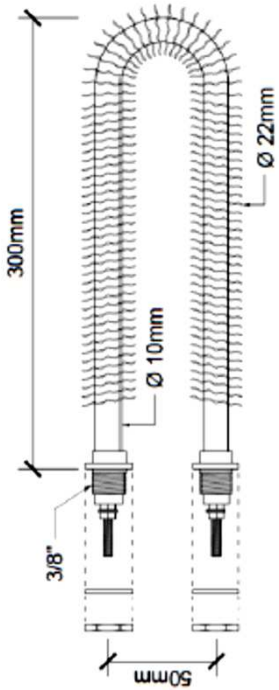
Options

Low inlet temperature option

This option consists in resistances which heat the inlet air.
Its characteristics are:

- Finned stainless steel resistances: 3x800W, 400V
- Seat of resistance in carbon steel with cataphoretic treatment
- Dedicated control panel with AB THS-C thermostat
- Remote ON/OFF for the control of the dryer
- Permitted inlet air temperature with option: **from +20 to +50 ° C**
- Permitted inlet air temperature without option: **from +5 to +50 ° C**



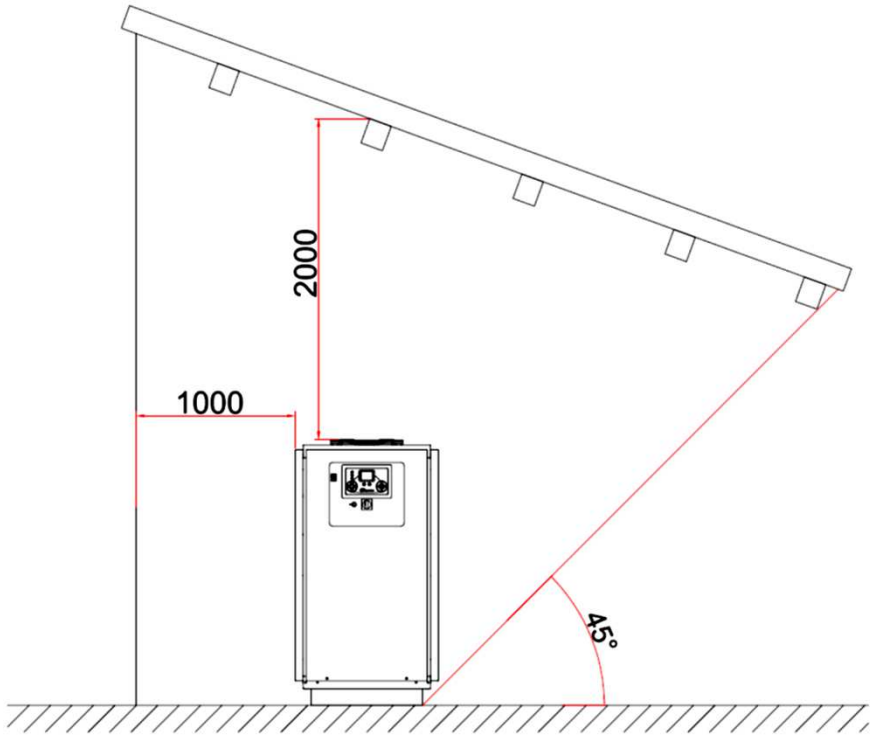


Options

External installation option

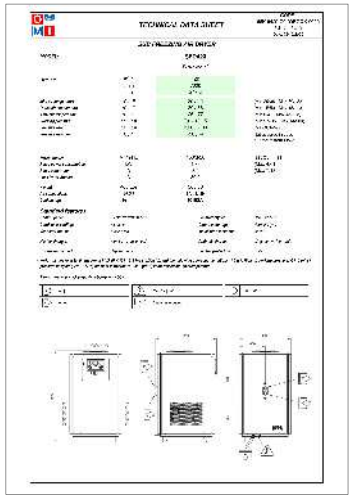
The dryer have to be secured with a protection-roof from sun radiation and from direct rain.

The dryer is provided with a degree of protection **IP54** (dedicated fan and case)

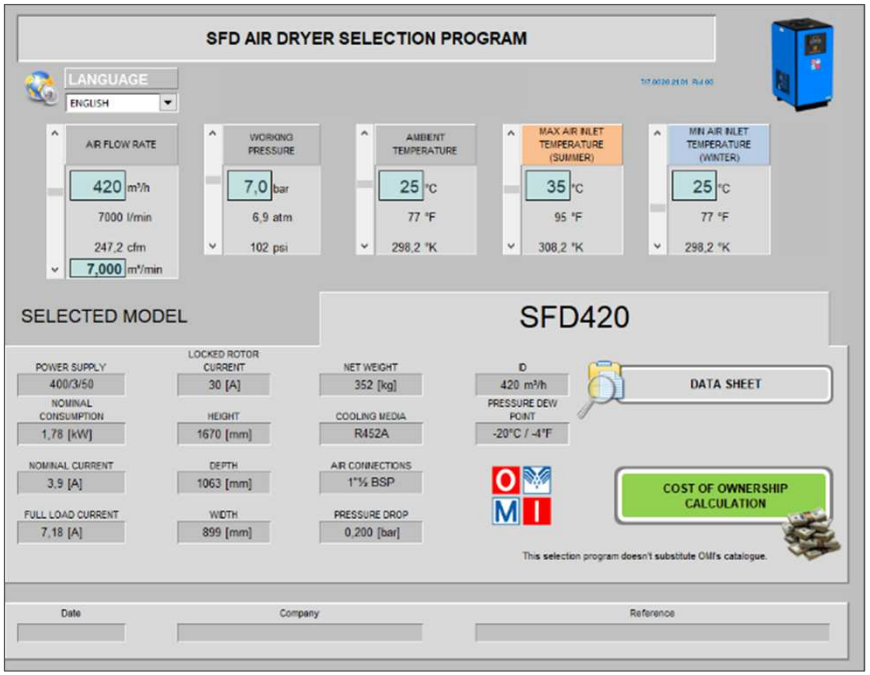


Supporting material

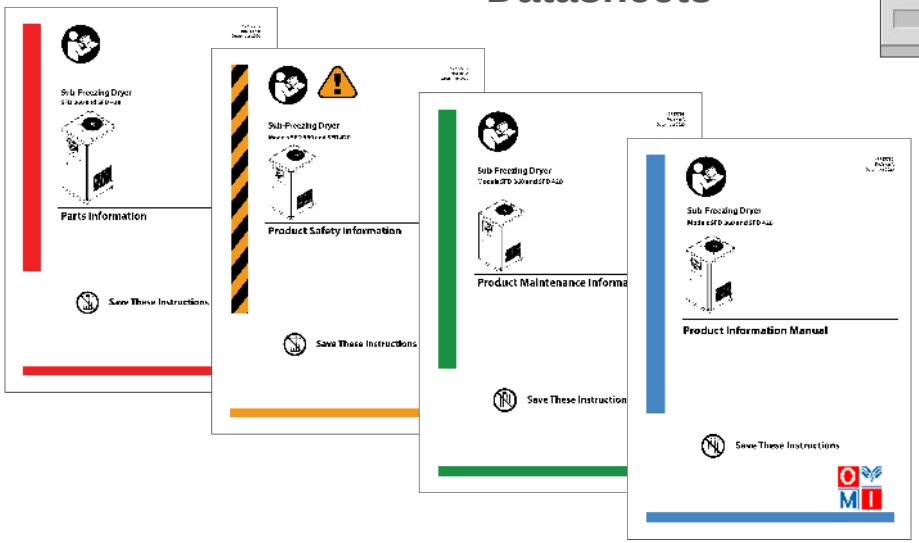
Brochure



Technical Datasheets



Sizing tool



Manuals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