

*Ultra low temperature freezers*

**Skadi<sup>®</sup>**

**-40°C and -86°C**

**Green Line**



MS-L GmbH  
Kälte- und Temperiertechnik

Schönbornstr. 7  
D-69234 Dielheim bei Heidelberg

Tel: (0)6222 / 93 56-60  
Fax: (0)6222 / 93 56-66  
eMail: Info@MS-L.de

# Skadi® Ultra low freezer series

Skadi ultra low temperature freezers are available in two temperature ranges: -40°C and -86°C.

The standard internal cabinet material is epoxy coated steel. As an option stainless steel interior is available. In our freezer ranges both upright and chest type freezers are available. Internal volumes vary from 191 liter up to 730 liter.

Our product design philosophy is based on three principles: customers needs, quality and innovation. These three principles are carried out always with the customer in mind.



## Customer needs



Safety for your samples, your research material is the most important when discussing cold storage. Therefore Skadi only uses the most reliable components available in the world.

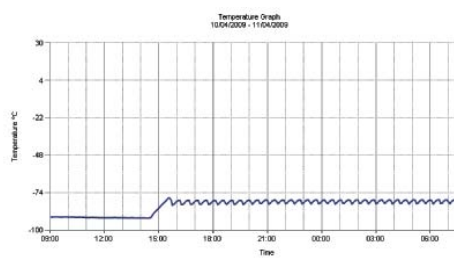
For our Skadi® green line we only use our own developed compressors in combination with our unique WhisperFreeze® technology. This combination stands for smoothly running compressors with the lowest power consumption and noise level in the market.

We are a pioneer in the market using standard only ecological refrigerants in our freezers. Unlike the traditional mixed synthetic potent greenhouse gases, we use 100% pure natural refrigerants which are contributing to your carbon footprint.

## European quality control

All ULT freezers are tested in a special designed climatic chamber for at least 1 week in the most extreme conditions. This also gives us time to add special wishes and options to the products.

All our units come standard with a test certificate with a temperature graph powered by our Wireless Lab system (see the back of this brochure to learn more about Wireless Lab).



### Innovation

The Kyoto protocol targeted the world to reduce carbon dioxide(CO<sub>2</sub>) emissions. Besides the traditional used HFC refrigerants like R404a and R508b which are potent greenhouse gases will be banned by European law soon.

All above important items are now combined in a freezer with even better performance and a lower sound level. Last but not least this leads to dramatic operational cost reduction.



#### Skadi

The word Skadi is originating from the Nordic mythology (Skaði). Skadi is a powerful goddess of winter. Together with her wolf she survives in the bitter cold mountains.

#### REAL GREEN MEANS:

- **Definitely the lowest power consumption;**
  - up to 30 % reduction in electricity costs;
  - emit less heat into your laboratory, minimizing air conditioning costs;
  - save 300 up to 1000 euro a year.
- **Definitely the lowest sound level;**
  - WhisperFreeze® technology;
- **Definitely the most ecological refrigeration system;**
  - natural refrigerants.
- **Definitely CO<sub>2</sub> reduction => minimizes carbon footprint.**

### Calculation example:

$$[\text{kWh} / 24 \text{ h}] \times [\text{kWh costs in Europe}] \times [365 \text{ days}]$$

#### Traditional DF8520:

$$[18 \text{ kWh} / 24 \text{ h}] \times [€ 0.13 / \text{kWh}] \times [365 \text{ days}] = \quad \mathbf{854,10} \quad \text{euro}$$

#### Green Line DF8520GL:

$$[12.24 \text{ kWh} / 24 \text{ h}] \times [€ 0.13 / \text{kWh}] \times [365 \text{ days}] = \quad \mathbf{580,80} \quad \text{euro}$$

#### Savings each year:

<b>savings in electricity costs:</b>	<b>273,30</b>	<b>euro</b>
<b>savings on CO<sub>2</sub> output*:</b>	<b>1.675,50</b>	<b>kg CO<sub>2</sub></b>
<b>savings on trees to grow:</b>	<b>111</b>	<b>trees</b>

This calculation example compares with our standard DF8520 model. Before designing the Green Line, this traditional freezer already used to be one of the lowest power freezers in the market!

**Conclusion:** check average power consumption, fill in the equation above and easily save € 300 up to € 1000 a year while reducing CO<sub>2</sub> output.

\*calculations for CO<sub>2</sub> output is according to the TEWI calculation (Total Equivalent Warming Impact).

# **-86°C** *ULT freezer series* **upright**

## **Eye-level control**

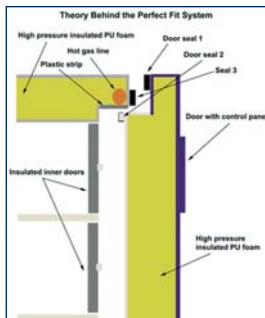
Our upright freezers are available from 276 liter up to 730 liter. The units come standard with eye level control panel with following specifications:

- multi-position key switch: on, off and set;
- bright, easy to read, digital display;
- readout option in 1 and 0.1 °C increments;
- key protected menu;
- adjustable temperature set point;
- audible and visual high / low temperature alarm;
- power outage alarm with battery backup;
- voltage indication and stabilisation booster;
- clean filter alarm;
- door alarm (also for CO<sub>2</sub> backup System);
- remote alarm (NO/NC/COM);
- RS232 / RS485 port (free software to download);
- service friendly plug & play detachable cable housing;
- ROHS compliant.



*eye-level control*

## **Perfect Fit® door sealing and isolation system**



*The theory behind the Perfect Fit System®*

Unlike the traditional flat sealing doors, Skadi uses an additional 70 mm extended part which fits perfectly as a seal inside the cabinet. We use the hot gas lines to heat up the cabinet seal to prevent ice forming. A total of 3 separate gaskets make the Perfect Fit System® ensure low ice and tight door closure. Cold air loss is minimized by insulated inner doors (HDPE).



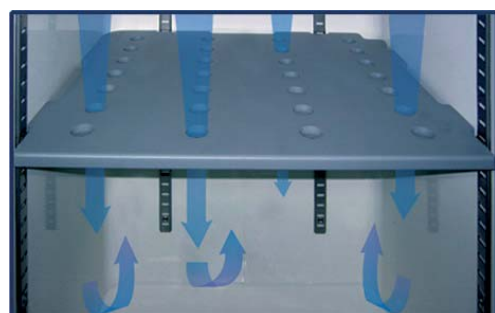
*3 separate gaskets*

## **HDPE shelves create best uniformity**

To continue our leadership in innovation in the market we designed the HDPE shelf system. HDPE is the high density version of PE plastic. It is harder, stronger and is highly corrosion resistant. Using HDPE as material we were able to add shelf air circulation holes which increase the temperature uniformity between the compartments.

*Benefits HDPE shelves:*

- Corrosion resistant;
- Scratch tolerant;
- Chemically resistant;
- Non toxic making it environmentally safe;
- Superior temperature uniformity;
- Lightweight;
- Freeze resistant (down to -120°C);
- Handles easily 50 kg of load;
- Shelf flatness guaranteed even at heavy loads.



*superior temperature uniformity*

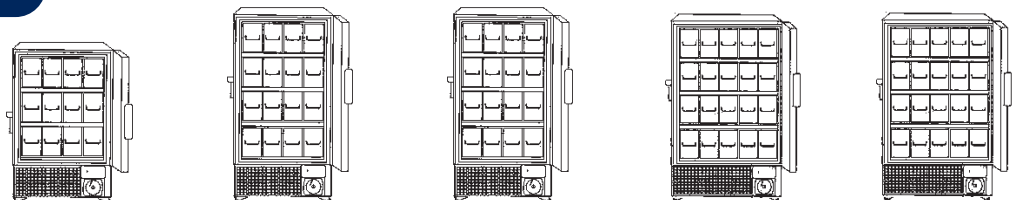


# Skadi® Green Line

## -86°C ULT freezer series upright

Model no:	DF8510GL	DF8514GL	DF8517GL	DF8520GL	DF8524GL
Capacity	276 l	369 l	484 l	605 l	730 l
Inner doors	3 inner doors	4 inner doors	4 inner doors	4 inner doors	4 inner doors
Shelves	2	3	3	3	3
Sample throughput holes	3 built-in access ports are standard (18 mm inner diam.)				
Temperature range	-40°C to -86°C (factory set on -80°C)				
Microprocessor	adjustable set-point, high alarm, low alarm, door alarm, voltage alarm, power failure alarm, clean filter alarm (audible, visual and remote alarm)				
Noise level according NEN-EN-ISO 11202	48 dB(A)	49 dB(A)	49 dB(A)	49 dB(A)	50 dB(A)
Refrigeration	hydrocarbon natural refrigerants (CFC/ HFC free) safety compliant EN60335-2-24				
High stage compressor	1¼ HP	1¼ HP	1¼ HP	1¼ HP	1¼ HP
Low stage compressor	1¼ HP	1¼ HP	1¼ HP	1¼ HP	1¼ HP
External dimensions W x D x H mm	920x900x1740	920x900x1979	920x1050x1979	1070x1050x1979	1070x1180x1979
Internal dimensions W x D x H mm	600x480x960	600x480x1280	600x630x1280	750x630x1280	750x760x1280
Programmable	programmable, to -86°C, in 1°C increments, even at ambient temperatures up to +32°C				
Insulation	130 mm non-CFC, foamed in place polyurethane				
Certification	CE, CSA, UL certified				
Electrical	220-240V, 50/60* Hz				
Built-in voltage booster	standard for all models including voltage indicator and alarm				
Average power consumption	0.48 kWh 11.52 kWh / 24 h	0.49 kWh 11.76 kWh / 24 h	0.50 kWh 12 kWh / 24 h	0.51 kWh 12.24 kWh / 24 h	0.59 kWh 14.16 kWh / 24 h
Net weight	294 kg	334 kg	380 kg	410 kg	450 kg
Shipping dimensions W x D x H mm	314 kg 1160x1050x1880	354 kg 1150x1050x2200	400 kg 1150x1050x2200	430 kg 1150x1200x2200	470 kg 1150x1200x2200

### Storage capacity



Model no:	DF8510GL	DF8514GL	DF8517GL	DF8520GL	DF8524GL
Rack capacity	12 racks	16 racks	16 racks	20 racks	20 racks
2 inch / 50 mm boxes	180	240	320	400	500
Sample vials, 2ml	18.000	24.000	32.000	40.000	50.000
3 inch / 75 mm boxes	108	144	192	240	300
Sample vials, 4ml	10.800	14.400	19.200	24.000	30.000

above data is tested with empty units set on -80°C and ambient temperature of +22°C.

\* 60 Hz version is available on special request

# Skadi<sup>®</sup> Green Line

## -86°C ULT freezer series chest



Our chest freezers are available from 191 liter up to 593 liter. A very important detail in the design of our chest freezers is the lid opening mechanism. The lid and hinges positioning makes it possible to lift out storage racks 90 degrees independent from their position in the chest.

Model no:	DF9007GL	DF9010GL	DF9014GL	DF9017GL	DF9020GL
Capacity	191 l	295 l	392 l	492 l	593 l
Inner sub-lids	2 sub-lids	3 sub-lids	4 sub-lids	5 sub-lids	6 sub-lids
Sample throughput holes	2 built-in access ports are standard (18 mm inner diam.)				
Temperature range	-40°C to -86°C (factory set on -80°C)				
Microprocessor	adjustable set-point, high alarm, low alarm, door alarm, voltage alarm, power failure alarm, clean filter alarm (audible, visual and remote alarm)				
Noise level according NEN-EN-ISO 11202	47 dB(A)	48 dB(A)	48 dB(A)	49 dB(A)	49 dB(A)
Refrigeration	hydrocarbon natural refrigerants (CFC/ HFC free) safety compliant EN60335-2-24				
High stage compressor	1¼ HP	1¼ HP	1¼ HP	1¼ HP	1¼ HP
Low stage compressor	1¼ HP	1¼ HP	1¼ HP	1¼ HP	1¼ HP
External dimensions W x D x H mm	1280x790x1030	1590x790x1030	1880x790x1030	2180x790x1030	2480x790x1030
Internal dimensions W x D x H mm	570x500x670	870x500x670	1170x500x670	1470x500x670	1770x500x670
Programmable	programmable, to -86°C, in 1°C increments, even at ambient temperatures up to +32°C				
Insulation	130 mm non-CFC, foamed in place polyurethane				
Certification	CE, CSA, UL certified				
Electrical	220-240V, 50/60* Hz				
Built-in voltage booster	standard for all models including voltage indicator and alarm				
Average power consumption	0.40 kWh 9.60 kWh / 24 h	0.41 kWh 9.84 kWh / 24 h	0.42 kWh 10.08 kWh / 24 h	0.50 kWh 12 kWh / 24 h	0.59 kWh 14.16 kWh / 24 h
Net weight	211 kg	236 kg	261 kg	286 kg	311 kg
Shipping dimensions W x D x H mm	231 kg 1680x1050x1160	256 kg 1880x1050x1160	281 kg 2100x1050x1160	306 kg 2300x1050x1160	331 kg 2740x1050x1160

above data is tested with empty units set on -80°C and ambient temperature of +22°C.

\* 60 Hz version is available on special request

### Storage capacity

Model no:	DF9007GL	DF9010GL	DF9014GL	DF9017GL	DF9020GL
Rack capacity	12 racks	18 racks	24 racks	30 racks	36 racks
2 inch / 50 mm boxes	144	216	288	360	432
Sample vials, 2ml	14.400	21.600	28.800	36.000	43.200
3 inch / 75 mm boxes	96	144	192	240	288
Sample vials, 4ml	9.600	14.400	19.200	24.000	28.800



# Skadi® Green Line

## -45°C freezer series upright

Model no:	DF3510GL	DF3514GL	DF3517GL	DF3520GL	DF3524GL
Capacity	276 l	369 l	484 l	605 l	730 l
Inner doors	3 inner doors	4 inner doors	4 inner doors	4 inner doors	4 inner doors
Shelves	2	3	3	3	3
Temperature range	-20°C to -45°C (factory set on -40°C)				
Microprocessor	adjustable set-point, high alarm, low alarm, door alarm, voltage alarm, power failure alarm, clean filter alarm (audible, visual and remote alarm)				
Single compressor	1¼ HP	1¼ HP	1¼ HP	1¼ HP	1¼ HP
External dimensions W x D x H mm	920x900x1740	920x900x1979	920x1050x1979	1070x1050x1979	1070x1180x1979
Internal dimensions W x D x H mm	600x480x960	600x480x1280	600x630x1280	750x630x1280	750x760x1280
Programmable	programmable, to -86°C, in 1°C increments, even at ambient temperatures up to +32°C				
Insulation	130 mm non-CFC, foamed in place polyurethane				
Certification	CE, CSA, UL certified				
Electrical	220-240V, 50/60* Hz				
Built-in voltage booster	standard for all models including voltage indicator and alarm				
Net weight	265 kg	305 kg	350 kg	380 kg	420 kg
Shipping dimensions W x D x H mm	315 kg 1160x1050x1880	355 kg 1150x1050x2200	400 kg 1150x1050x2200	430 kg 1150x1200x2200	470 kg 1150x1200x2200

## -45°C freezer series chest



Model no:	DF4507GL	DF4510GL	DF4514GL	DF4517GL	DF4520GL
Capacity	191 l	295 l	392 l	492 l	593 l
Inner sub-lids	2 sub-lids	3 sub-lids	4 sub-lids	5 sub-lids	6 sub-lids
Temperature range	-20°C to -45°C (factory set on -40°C)				
Microprocessor	adjustable set-point, high alarm, low alarm, door alarm, voltage alarm, power failure alarm, clean filter alarm (audible, visual and remote alarm)				
Single stage compressor	1¼ HP	1¼ HP	1¼ HP	1¼ HP	1¼ HP
External dimensions W x D x H mm	1280x790x1030	1590x790x1030	1880x790x1030	2180x790x1030	2480x790x1030
Internal dimensions W x D x H mm	570x500x670	870x500x670	1170x500x670	1470x500x670	1770x500x670
Programmable	programmable, to -86°C, in 1°C increments, even at ambient temperatures up to +32°C				
Insulation	130 mm non-CFC, foamed in place polyurethane				
Certification	CE, CSA, UL certified				
Electrical	220-240V, 50/60* Hz				
Built-in voltage booster	standard for all models including voltage indicator and alarm				
Net weight	185 kg	205 kg	230 kg	255 kg	285 kg
Shipping dimensions W x D x H mm	231 kg 1680x1050x1160	256 kg 1880x1050x1160	281 kg 2100x1050x1160	306 kg 2300x1050x1160	331 kg 2740x1050x1160

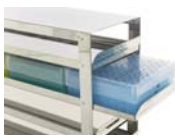
above data is tested with empty units set on -40°C and ambient temperature of +22°C.

\* 60 Hz version is available on special request

## Options & accessories

We offer several kinds of inventory racks, boxes and dividers

### inventory racks



Rack type	Rack no:	Box size:	QTY Boxes	Fit in freezer model:
side opening	CR0062	2 inch / 50 mm	12	all chest freezers
	CR0063	3 inch / 75 mm	8	
	UR0066	2 inch / 50 mm	15	upright DF**10, DF**14
	UR0067	3 inch / 75 mm	9	
	UR0068	2 inch / 50 mm	20	upright DF**17, DF**20
	UR0069	3 inch / 75 mm	12	
	UR0070	2 inch / 50 mm	25	upright DF**24
UR0071	3 inch / 75 mm	15		
sliding shelves	UR1066	2 inch / 50 mm	15	upright DF**10, DF**14
	UR1067	3 inch / 75 mm	9	
	UR1068	2 inch / 50 mm	20	upright DF**17, DF**20
	UR1069	3 inch / 75 mm	12	
	UR1070	2 inch / 50 mm	25	upright DF**24
	UR1071	3 inch / 75 mm	15	

### cryo boxes

Box no:	Description:
POP02	Polypropylene 2 inch box with 9 x 9 grid divider
POP03	Polypropylene 3 inch box with 9 x 9 grid divider
PP0060	Cardboard storage 2 inch box (excl. dividers)
PP0061	Cardboard storage 3 inch box (excl. dividers)

### dividers to fit in cardboard boxes

Divider no:	Description:
PP1049	Storage box divider 7 x 7, 16 mm, 49 cell
PP1064	Storage box divider 8 x 8, 14 mm, 64 cell
PP1081	Storage box divider 9 x 9, 13 mm, 81 cell
PP1100	Storage box divider 10 x 10, 12 mm, 100 cell

### other options & accessories

Model no:	Description:
CH0067	6 inch chart recorder, circular, 7 day
CP0067	recorder paper for CH0067 (package with 52 pieces)
IP0067	red pens for CH0067 (package with 6 pieces)
LCU070	CO <sub>2</sub> back-up system for upright freezers
LCC070	CO <sub>2</sub> back-up system for chest freezers
LCU071	LN <sub>2</sub> back-up system for upright freezers
LCC071	LN <sub>2</sub> back-up system for chest freezers
SS8517	sliding shelves option for model DF**17 series
IQOQ100	factory filled in IQ/OQ protocol package
IFS200	RS232/485 hardware package to connect to software
PR100	heated pressure equalisation port
1004c	large door handle with integrated lock
CG100	Shark® short-term protection glove (package with 2 pieces)
WC100	water cooled condenser
IDK05	5 inner door kit (instead of standard 4 doors for upright freezers)



CH0047, chart recorder



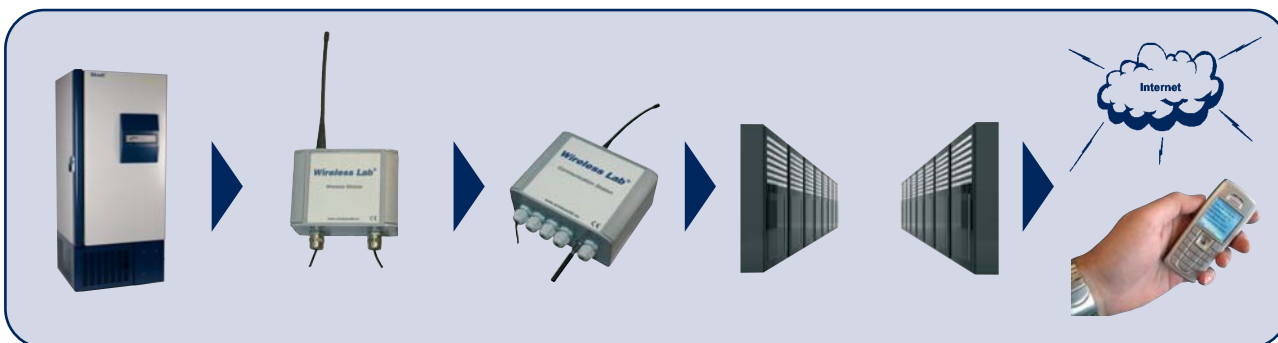
LCU070, CO2 backup system



CG100, protection glove

## Wireless Lab® plug & play monitoring & alarm system

Wireless Lab is a wireless and plug & play solution for easy monitoring and safe storage of temperature, CO<sub>2</sub> and relative humidity data. Monitor your freezers without using any paper, installation time or software. Just check your equipment performance on every PC with internet access. Additionally you can receive alarms on your mobile phone or e-mail address.



- Put sensor (PT1000, CO<sub>2</sub> sensor, RH sensor) inside your freezers. The wireless module is battery powered
- The wireless modules are sending the data to the main communication station (max 32 per station)
- All data is collected and transmitted to a secured data server (with LAN or GPRS)
- Wherever you are: on [www.wirelesslab.eu](http://www.wirelesslab.eu) you can check your equipment performance and receive alarms