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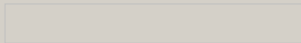
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# Refrigeration and Air-conditioning Technology

Refrigeration and air-conditioning technology has to cope with many challenges – for one thing the demanding technical requirements in the fields of electrical engineering, thermodynamics and refrigeration processes, as well as the need for practical technical skills. Furthermore, however, it is also necessary to keep abreast of political developments, such as the Kyoto protocol and the European regulation on fluorinated greenhouse gases (F-gas regulation).

With the versatile training systems from Lucas-Nülle you can train students in all the educational topics needed in practice. We provide you with the equipment and tools necessary to prepare new technicians for both existing and future challenges.

## RTH Thermodynamics



### RTH Thermodynamics

Heat cycles in refrigerators, pressure-temperature responses and transfer of energy are all physical and thermodynamic processes. This means that understanding the roots of how to work in refrigeration requires an understanding of the fundamentals of thermodynamics.

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## RTH1 Basic knowledge of thermodynamics

### RTH1 Basic knowledge of thermodynamics

Thermodynamics form the basis for heat cycle processes and therefore for the processes of refrigeration. The Lucas-Nülle set “RTH1 Basic knowledge of thermodynamics” imparts the fundamentals of thermodynamics so that they can be used later on and can illuminate thermodynamic processes.

Experiments to be carried out by both students and teachers in the accompanying ILA courses cover the following topics:

- Pressure, hydrostatic pressure
- Temperature
- Quantities of heat
- Mixing
- Mass
- Volume
- Density
- Forms of energy
- Universal gas laws
- Evaporation
- Liquefaction
- Compression
- Expansion

Lista artykułów:

#### Lista artykułów:

Pos.

nazwa produktu

Bestell-Nr.

Anz.

1

#### **Student experiments in thermodynamics**

CO3207-4A

1

2

#### **Teacher experiment in thermodynamics**

CO3207-4B

1

Materialy szkoleniowe:

**Materialy szkoleniowe:**

Pos.

nazwa produktu

Bestell-Nr.

Anz.  
3

**MeasureLAB software**

LM8645

1

Akcesoria:

Pos.

nazwa produktu

Bestell-Nr.

Anz.  
4

**Cobra4 thermodynamics set**

LM8644

1

5

**USB charging unit for Cobra4**

LM8651

1

6

**Cyfrowy miernik uniwersalny Multi 13S**

LM2330

1

7

**Power supply: DC 0...12 V, 2 A/AC: 6 V, 12 V, 5 A**

LM8650

1

8

**Butane cartridge, C 206 GLS, without valve, 190 g**

LM8646

1

9

**Two-stage vacuum pump with oil filter**

CO3207-2Z

1

10

**Press-on nipple, DN10 5/8"**

LM8653

1

11

**Antifrogen "L", 10 kg**

LM8649

1  
12Wagi elektroniczne, 100 kg, zasilane baterią 9 V,  
LM8581

1

## RCC1 Open- and closed-loop control in refrigeration and air-conditioning systems

### RCC1 Open- and closed-loop control in refrigeration and air-conditioning systems

This set is designed for training in the fundamentals of process control systems for refrigeration and air-conditioning systems. Trainees, student professionals and technicians from refrigeration and air-conditioning companies with training related to their profession are guided step by step through open- and closed-loop control techniques as used in refrigeration and air-conditioning and acquire a high-quality grounding for their work in the future. The combination of theory and practice ensures they get solid training.

### RCC11 Open- and closed-loop control

#### RCC11 Open- and closed-loop control

Anyone wishing to work in refrigeration or air-conditioning needs to know all about the many electrical and control components, as well as the systems themselves. The course teaches aspects of electrical engineering, open- and closed-loop control, as well as some drive technology in a way that is practical and specific to refrigeration and air-conditioning.

Standards specifically applicable to the circuits used in construction of refrigeration systems are observed and the relevance to common practice is underpinned by using technical documentation from a variety of manufacturers.

The following training contents are covered:

- Generating a control voltage
- Circuits with primary and auxiliary contactors
- Circuits with time-delay relays
- Thermostats and pressures switches in contact control systems
- Safety chain for refrigeration and air-conditioning control systems

Wyposażenie podstawowe, w skład którego wchodzi:

**Wyposażenie podstawowe, w skład którego wchodzi:**

Motor required for open- and closed-loop control:

Pos.

nazwa produktu

Bestell-Nr.

Anz.

13

**Switches and buttons for contactor controls**

CO3209-1K

1

14

**Zasilacz sieciowy do sterownika klimatyzacji, z transformatorem sterującym, RCD typu A i B, LSS 1- i 3-biegunowy**

CO3209-5B

1

15

**Moduł sterujący z 3 głównymi stycznikami ze stykami pomocniczymi**

CO3209-5C

1

16

**Moduł sterujący z 3 stycznikami pomocniczymi i stykami pomocniczymi**

CO3209-5D

1

17

**Wyłącznik ochronny silnika, podwójny, z silnikiem z rozruchem z częścią uzwojenia, 1,8 ... 2,5 A**

CO3209-5E

1

18

**Przełącznik ochronny silnika ze stycznikiem głównym i stykami pomocniczymi, 2 zwierne/2 rozwierne**

CO3209-5W

1

19

**Przełącznik czasowy z opóźnieniem załączenia**

CO3209-5G

1

20

**Przełącznik czasowy statyczny**

CO3209-5H

1

21

**Mechaniczny zegar do odszraniania, 2-kanalowy**

CO3209-5L

1

22

<b>Termostat do pomieszczeń do ogrzewania i chłodzenia</b> CO3209-5N	1 23
<b>Łącznik wysokociśnieniowy do obiegu grzewczego</b> CO3209-5P	1 24
<b>Łącznik niskociśnieniowy do obiegu grzewczego</b> CO3209-5Q	1 25
<b>Łącznik ciśnieniowy różnicowy do instalacji olejowej</b> CO3209-5R	1 26
<b>Czasowy przekaźnik wielofunkcyjny</b> CO3209-5J	1 27
<b>Wyłącznik silnika z pełną ochroną, z dodatkowym potencjometrem 10 k</b> CO3209-5M	1 28
<b>Silnik asynchroniczny prądu trójfazowego 1 kW, n = 1400 (230 V / 400 V)</b> SE2673-1H	1 29
<b>Ośłona wału 1 kW</b> SE2662-6C	1
<p>Materialy szkoleniowe:</p> <input type="text"/>	
<b><u>Materialy szkoleniowe:</u></b>	
<p>Pos. nazwa produktu Bestell-Nr.</p>	<p>Anz. 30</p>
<b>Interactive Lab Assistant: Closed-loop control of cycles in refrigeration and air-conditioning systems</b> SO2801-1A	1

Akcesoria:

Pos.

nazwa produktu

Bestell-Nr.

Anz.

31

**Set of safety measurement cables, 4mm (88 leads)**

SO5148-1C

1

32

**Bezpieczny wtyk połączeniowy, zielono-żółty, 4 mm z odgałęzieniem, 1000 V/32 A, CAT II**

SO5126-3W

15

33

**Mobilne stanowisko doświadczalne, wykonane z profili aluminiowych, trzypiętrowe, cztery gniazda, 1250 x 700 x 1995 mm**

ST7200-3A

1

Opcjonalne akcesoria:

Pos.

nazwa produktu

Bestell-Nr.

Anz.

34

**Wall or aluminium-profile mounting cable storage for 48 cables**

ST8003-8E

2

35

**Uchwyt do płaskiego monitora ze składanym ramieniem, nośność do 15 kg, do zamocowania na profilu aluminiowym, VESA 75/100**

ST8010-4T

1

36

**PC holder for SybaPro experiment trolleys, height/width adjustable**

ST7200-5F

1

37

**Ochronne etui na mobilne stanowisko doświadczalne – 3-piętrowe**

ST8010-9Y

1

**RCC12 Compressor control**

RCC12 Compressor control



One of the main components in a refrigeration system is the compressor. This needs to be controlled along with its drive motor in a way that fits the application. The compressor control course covers and conveys the various methods for shutting down and running up compressors in refrigeration and air-conditioning systems. These methods are used on a daily basis in genuine systems and count as basic knowledge for refrigeration technicians.

Training contents:

- Pump-down compressor control with part winding starting system
- Pump-out compressor control with starting system
- Compressor control system with two speeds
- Turning on three-phase motors directly
- Turning on star-delta motors

Uzupełnienie do wyposażenia podstawowego:

**Uzupełnienie do wyposażenia podstawowego:**

Pos.

nazwa produktu

Bestell-Nr.

Anz.

38

**Zawór elektromagnetyczny EVR 2 230V/50Hz**

CO3209-5S

1

39

**Regulator punktowy do układów chłodzenia**

CO3209-5T

1

40

**Przełącznik czasowy do rozruchu gwiazda-trójkąt**

CO3209-5K

1

41

**Silnik prądu trójfazowego z wirnikiem klatkowym 1kW**

SE2672-5G

1

42

**Silnik prądu trójfazowego z przełączaniem biegunów w układzie Dahlandera 1 kW**

SE2672-5K

1

43

**Three-phase asynchronous machine part winding 1kW**

SE2673-1Q

1

44

**Bezpieczny wtyk połączeniowy, zielono-żółty, 4 mm z odgałęzieniem, 1000 V/32 A, CAT II**

SO5126-3W

5

Materialy szkoleniowe:

**Materialy szkoleniowe:**

Pos.

nazwa produktu

Bestell-Nr.

Anz.

45

**Interactive Lab Assistant: Compressor control**

SO2801-1B

1

## RCC2 Modular refrigeration training system

### RCC2 Modular refrigeration training system

The modular refrigeration training system serves as an ideal basis for understanding the complexities of a refrigeration circuit. Different applications and user-activated malfunctions allow a broad examination of the refrigeration circuit which can be projected onto larger applications.

The modular refrigeration training system is available in two versions, one using refrigerant R134a and the other using the innovative refrigerant R290.

### Modular R134a refrigeration training system

### Modular R134a refrigeration training system

This modular refrigeration training system allows trainees to gain extensive experience of the materials used in refrigeration systems. The training focus of this module is to observe the refrigeration circuit itself. Rather than teaching professional skills as such, its objective is more to gain an understanding for the technology and the function of the components. Various applications, valves and other components of a refrigeration circuit are investigated by means of an authentic cold storage cell under a variety of conditions. The key aspects include how the quantity of refrigerant, the ambient temperature or faults with certain components affect the system. In addition, training is provided in the environmentally conscious handling of refrigerant when filling or emptying the system.

## RCC21 Modular R134a refrigeration training system

### RCC21 Modular R134a refrigeration training system

This course teaches participants fundamental knowledge of refrigeration circuits. They learn about the function of components and the responses of the refrigeration circuit as a whole.

The following training contents are covered:

- Design and function of a refrigeration circuit
- Connection of system components to a closed refrigeration circuit via hoses without a manifold
- Connection of a 4-way pressure gauge
- Rough pressure testing for leaks using nitrogen
- Identifying leaks
- Emptying and drying
- Handling refrigerant cylinders
- Design, function, configuration and testing of safety equipment (high pressure and low pressure)
- Testing and configuring correct superheating
- Changes to superheating and thermal expansion valves

Wyposażenie podstawowe, w skład którego wchodzi:

#### Wyposażenie podstawowe, w skład którego wchodzi:

Pos.

nazwa produktu

Bestell-Nr.

Anz.

46

**W pełni izolowana przenośna komora chłodnicza z parownikiem, wentylatorami i grzałką 165W**

CO3207-1A

1

47

**Zestaw sprężarki z akumulatorem, 230 V/50 Hz**

CO3207-1B

1

48

**EVR2 zawór elektromagnetyczny, 230 V/50 Hz, 10W**

CO3207-1D

1

49

**Suszarka z filtrem z oknem inspekcyjnym, kołnierz 6 mm**

CO3207-1E

1

50

**Room thermostat with switchable socket for mains power**

CO3207-1F	1
	51
<b>Termostatyczny zawór rozprężny (TEV) TN2</b>	
CO3207-1G	1
	52
<b>Miernik podciśnienia ze wskazówką nastawczą</b>	
CO3207-1M	1
	53
<b>Zestaw przewodów połączeniowych do chłodziarek do łączenia wszystkich podzespołów bez użycia narzędzi</b>	
CO3207-1X	1
Materiały szkoleniowe:	
<input type="text"/>	
<b><u>Materiały szkoleniowe:</u></b>	
Pos.	
nazwa produktu	
Bestell-Nr.	
	Anz.
	54
<b>Interactive Lab Assistant: Modular R134a refrigeration training system</b>	
SO2801-1D	1
Tools and equipment:	
Pos.	
nazwa produktu	
Bestell-Nr.	
	Anz.
	55
<b>Wagi elektroniczne, 100 kg, zasilane baterią 9 V,</b>	
LM8581	1
	56
<b>2-kanałowy termometr różnicowy z wyświetlaczem i złączem do czujników radiowych</b>	
LM8575	1
	57
<b>Ośłona ochronna TopSafe do 2-kanałowego termometru różnicowego</b>	
LM8576	1
	58
<b>Czujnik powierzchniowy typu K z bardzo dużą końcówką pomiarową, wodoszczelny</b>	

LM8577	1
	59
<b>Stykowy czujnik rurkowy typu K z wymiennymi końcówkami pomiarowymi do 5..65-mm pi</b>	
LM8578	1
	60
<b>Bateria manometrów ze skrzynką do przechowywania i przewodem</b>	
LM8582	1
	61
<b>Leak detection equipment for refrigerant and technical gases</b>	
LM8593	1
	62
<b>Test leak for testing leak detection equipment (50ml)</b>	
LM8594	1
	63
<b>Nitrogen pressure regulator RA825GN50, cylinder pressure 200 bars, excess pressure release at 50 bars</b>	
LM8596	1
	64
<b>Cylinder connector for R134a refrigerant, 7/16" tube connector</b>	
LM8597	1
	65
<b>Wysokociśnieniowy zestaw przyrządów do usuwania czynnika chłodniczego, 38,5 bara, 230 V/50...60 Hz</b>	
LM8580	1
	66
<b>Two-stage vacuum pump with oil filter</b>	
CO3207-2Z	1
	67
<b>Tool set (12 tools) for "modular refrigeration training system"</b>	
ST8070-5C	1

Akcesoria:		Anz.
Pos.	nazwa produktu	
Bestell-Nr.		
		68
	<b>Oil basin, 560x430x85 mm</b>	
	LM8598	1
		69
	<b>Bottle for recycling refrigerant, unfilled, T12Y/S50</b>	
	LM8592	1
		70
	<b>Mobilne stanowisko doświadczalne IMS, SybaPro, 1200 mm, dwupoziomowe Rama doświadczalna</b>	
	ST7200-3T	1
		71
	<b>Mobile experiment stand for mounting air-conditioning and refrigeration chambers, SybaPro</b>	
	ST7200-3Y	1
Opcjonalne akcesoria:		
<b>Operating materials</b>		
Pos.	nazwa produktu	
Bestell-Nr.		
		Anz.
		72
	<b>Uchwyt do płaskiego monitora ze składanym ramieniem, nośność do 15 kg, do zamocowania na profilu aluminiowym, VESA 75/100</b>	
	ST8010-4T	1
		73
	<b>PC holder for SybaPro experiment trolleys, height/width adjustable</b>	
	ST7200-5F	1
		74
	<b>Ośłona ochronna do stanowisk doświadczalnych IMS 1200 mm z panelem szkoleniowym</b>	
	ST8010-8L	1
		75
	<b>Refrigerant, Suva 134a in pressurised cylinder, contents 12,5l</b>	
	LM8590	1
		76

## Nitrogen in pressurized cylinder, 5 l

LM8591

1

## RCC22 Measurement and control in R134a refrigeration training system

### RCC22 Measurement and control in R134a refrigeration training system

This supplement to the modular R134a refrigeration training system allows for the measurement and assessment of the system's operating status. Various fault conditions are introduced and their effects on the refrigeration system are observed and assessed. Use of additional components allows the system to be modified in order to familiarise students with the effects and function of those components.

The following training contents are covered:

- Comparison and assessment of readings measured with the system in various states
- Introduction of faults and assessment of them
- Handling a digital pressure gauge
- Calculation and importance of energy efficiency ratio (EER)
- Use of pressure regulators

Uzupełnienie do wyposażenia podstawowego:

### Uzupełnienie do wyposażenia podstawowego:

Pos.

nazwa produktu

Bestell-Nr.

Anz.  
77

#### Regulator ciśnienia parowania KVP 12

CO3207-1H

1

78

#### Regulator obejściowy gorącego gazu KVC 12

CO3207-1J

1

79

#### Pressure gauge with refrigerant scale

CO3207-2H

1

80

#### Refrigerant mass flow-meter, glass with float

CO3207-1Q

1

Materialy szkoleniowe:

**Materialy szkoleniowe:**

Pos.

nazwa produktu

Bestell-Nr.

Anz.

81

**Interactive Lab Assistant: Measurement and control in R134a refrigeration training system**

SO2801-1E

1

Przyrządy pomiarowe:

**Przyrządy pomiarowe:**

Pos.

nazwa produktu

Bestell-Nr.

Anz.

82

**Power Clamp Meter with True RMS, 3 3/4-digit, 1000 A AC/DC**

LM2336

1

83

**“Schuko”-type measurement adapter with 4mm-safety measuring sockets**

LM2337

1

84

**Cyfrowy przyrząd analityczny do chłodziarek w skrzynce, USB, zasilacz**

LM8583

1



## RCC23 Supplementary set – capillary tube system R134a

## RCC23 Supplementary set – capillary tube system R134a

The capillary tube system supplementary set demonstrates the design and function of a system used in the majority of household fridges.

The following training contents are covered:

- Design and function
- Filling, emptying, leak testing
- Start-up
- Effect of capillary tubes of different lengths
- Shut-down

Uzupełnienie do wyposażenia podstawowego:

### Uzupełnienie do wyposażenia podstawowego:

Pos.

nazwa produktu

Bestell-Nr.

Anz.

85

### Zestaw sprężarki bez akumulatora, 230 V/50 Hz

CO3207-1C

1

86

### Capillary tube for regulating refrigeration systems 1,5m

CO3207-2X

1

87

### Capillary tube for regulating refrigeration systems 2,0m

CO3207-2Y

1

Materialy szkoleniowe:

### Materialy szkoleniowe:

Pos.

nazwa produktu

Bestell-Nr.

Anz.

88

### Interactive Lab Assistant: R134a capillary tube system

SO2801-1F

1

## Modular R290 refrigeration training system

### Modular R290 refrigeration training system

The modular R290 refrigeration training system is particularly well-suited to lucidly convey the complexities of a basic refrigeration system. The system's behaviour is demonstrated not only by means of animations, but also instructions concerning a real circuit operated with the latest "refrigerant of the future" **R290** (propane). R290 is a natural refrigerant with low GWP (global warming potential) and not affected by "phasing down", in contrast to many other refrigerants.

The safe design and the small quantities of refrigerant R290 with which refrigeration circuits need to be filled allow safe handling not necessitating any protective measures other than the standard ones. The entire equipment set thus allows for an independent, innovative, multimedia-based learning process leading to a successful outcome.

### RCC24 refrigeration training system with R290

### RCC24 refrigeration training system with R290

Equipment set RCC24 shows students how to put a basic refrigeration system safely into operation. Animations elucidating design and providing details enable a step-by-step progression toward commissioning of a modern R290 refrigeration system. This reliable process covers the following aspects relating to a refrigeration circuit's most important components:

- Introduction
- Layout
- Connection
- Function testing
- Leakage testing
- Adjustment
- Handling

Subsequent commissioning of the refrigeration system provides students with confirmation that they have successfully worked through the contents. In addition, students learn about the functions and handling of the most important tools and measuring instruments in refrigeration technology.

The following educational content is imparted:

- Design and function
- Filling, evacuation, leakage testing
- Commissioning/filling with refrigerant
- Operating characteristics of a basic refrigeration system
- Decommissioning

Wyposażenie podstawowe, w skład którego wchodzi:

**Wyposażenie podstawowe, w skład którego wchodzi:**

Pos. nazwa produktu Bestell-Nr.	Anz.
	89
<b>Fully insulated mobile refrigeration chamber with evaporator, fans, 165W heater</b> CO3207-2A	1
	90
<b>Compressor kit with accumulator, 230V/50Hz R290</b> CO3207-2B	1
	91
<b>Solenoid valve EVR2, 230 V/50 Hz, 10 W, R290</b> CO3207-2M	1
	92
<b>Dehumidifier with sight glass and flanged connections, R290</b> CO3207-2J	1
	93
<b>Miernik podciśnienia ze wskazówką nastawczą</b> CO3207-1M	1
	94
<b>Zestaw przewodów połączeniowych do chłodziarek do łączenia wszystkich podzespołów bez użycia narzędzi</b> CO3207-1X	1

Materiały szkoleniowe:

**Materiały szkoleniowe:**

Pos. nazwa produktu Bestell-Nr.	Anz.
	95
<b>Interactive Lab Assistant: Modular R290 refrigeration training system</b> SO2801-1G	1

Przyrządy pomiarowe:

**Przyrządy pomiarowe:**

Pos.

nazwa produktu

Bestell-Nr.

Anz.

96

**Multi-gas measuring instrument with sensors for propane and oxygen**

LM8662

1

97

**Pressure reduction valve for test gas**

LM8663

1

98

**Test gas for multi-gas measuring instrument**

LM8664

1

99

**Wagi elektroniczne, 100 kg, zasilane baterią 9 V,**

LM8581

1

100

**2-kanałowy termometr różnicowy z wyświetlaczem i złączem do czujników radiowych**

LM8575

1

101

**Ośłona ochronna TopSafe do 2-kanałowego termometru różnicowego**

LM8576

1

102

**Czujnik powierzchniowy typu K z bardzo dużą końcówką pomiarową, wodoszczelny**

LM8577

1

103

**Stykowy czujnik rurkowy typu K z wymiennymi końcówkami pomiarowymi do 5..65-mm pi**

LM8578

1

104

**Bateria manometrów ze skrzynką do przechowywania i przewodem**

LM8582

1

105

**Leak detector for flammable gases**

LM8658

1

Tools and equipment:		
Pos.	nazwa produktu	Anz.
Bestell-Nr.		
		106
	<b>Cylinder connector for KM R290 to 7/16" hose connection</b>	
	LM8656	1
		107
	<b>Nitrogen pressure regulator RA825GN50, cylinder pressure 200 bars, excess pressure release at 50 bars</b>	
	LM8596	1
		108
	<b>Two-stage vacuum pump with oil filter</b>	
	CO3207-2Z	1
		109
	<b>Refrigerant suction station, 230 V/50 Hz</b>	
	LM8659	1
		110
	<b>Tool set (12 tools) for "modular refrigeration training system"</b>	
	ST8070-5C	1
Akcesoria:		
Pos.	nazwa produktu	
Bestell-Nr.		Anz.
		111
	<b>Oil basin, 560x430x85 mm</b>	
	LM8598	1
		112
	<b>Set of safety measurement cables, 4 mm (16 leads)</b>	
	SO5148-1T	1
		113
	<b>Mobile experiment stand for mounting air-conditioning and refrigeration chambers, SybaPro</b>	
	ST7200-3Y	1
		114
	<b>Mobilne stanowisko doświadczalne IMS, SybaPro, 1200 mm, dwupoziomowe Rama doświadczalna</b>	
	ST7200-3T	1

<b>Cockpit power supply duct for 3HU inserts to match 1200mm SybaPro tables, 216 PU</b> ST8033-1B	115  1 116
<b>AC power panel, 230V/16A with type-B RCD for AC/DC, 25A/30mA, 30PU</b> ST8008-6C	1 117
<b>AC output, 3x4mm safety sockets, indicator light, 12PU</b> ST8008-3F	1 118
<b>Side by side Socket panel unit, 3 sockets 42PU</b> ST8008-8G	2 119
<b>Blank panel, 78PU</b> ST8008-5L	1 120
<b>Blank panel, 12PU</b> ST8008-5A	1 121
<b>Cable connection, AC</b> ST7007-1N	1 122
<b>Tubing and cable holder, SybaMobile</b> ST7007-1R	1 123
<b>Wall or aluminium-profile mounting cable storage for 48 cables</b> ST8003-8E	1 124
<b>Uchwyt do płaskiego monitora ze składanym ramieniem, nośność do 15 kg, do zamocowania na profilu aluminiowym, VESA 75/100</b> ST8010-4T	1 125
<b>PC holder for SybaPro experiment trolleys, height/width adjustable</b> ST7200-5F	1 126
<b>Ośłona ochronna do stanowisk doświadczalnych IMS 1200 mm z panelem szkoleniowym</b> ST8010-8L	1

Opcjonalne akcesoria:

**Operating materials**

Pos.

nazwa produktu

Bestell-Nr.

Anz.  
127

**Jednofazowe przyłącze do sieci z wyłącznikiem, wyłącznikiem nadmiarowo-prądowym i gniazdem z zestykiem ochronnym**

CO3211-1A

1  
128

**Nitrogen in pressurized cylinder, 5 l**

LM8591

1  
129

**Pressurised cylinder filled with 12. 5 l of R290 refrigerant**

LM8657

1

**RCC25 Measurement and regulation in R290refrigeration training system**

**RCC25 Measurement and regulation in R290refrigeration training system**

Malfunctions and disruptions may occur every now and then, even after successful commissioning of a refrigeration system. To be prepared in case servicing is required, this equipment set allows simulation and metrological inspection of frequently occurring situations. By independently activating and repairing faults, students learn how to handle the refrigeration system, besides interpreting their symptoms and remedying the causes. In addition, students learn how to handle and operate the necessary measuring equipment.

In two further work steps, modification jobs are performed by furnishing the system firstly with an evaporation pressure regulator and secondly with a hot-gas by-pass regulator. Here, students learn how to correctly set pressure controllers and understand their influence on the behaviour of a refrigeration facility.

The following educational content is imparted:

- Influence of a soiled condenser
- Influence of a faulty evaporator fan
- Influence of a clogged dehumidifier
- Evaporation pressure regulation
- Hot-gas by-pass regulation
- Decommissioning

Supplementary Set comprising:

Pos.

nazwa produktu

Bestell-Nr.

Anz.

130

**Mass flow meter for R290 refrigerant**

CO3207-2F

1

131

**Evaporation pressure regulator, R290**

CO3207-2K

1

132

**Hot-gas by-pass regulator R290**

CO3207-2L

1

133

**Pressure gauge with refrigerant scale**

CO3207-2H

1

Materialy szkoleniowe:

**Materialy szkoleniowe:**

Pos.

nazwa produktu

Bestell-Nr.

Anz.

134

**Interactive Lab Assistant: Measurement and regulation in R290 refrigeration training system**

SO2801-1H

1

Przyrządy pomiarowe:

**Przyrządy pomiarowe:**

Pos.

nazwa produktu

Bestell-Nr.

Anz.

135

**Cyfrowy przyrząd analityczny do chłodziarek w skrzynce, USB, zasilacz**

LM8583

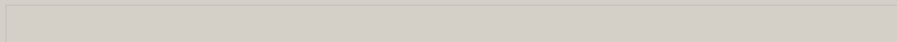
1

136

**Cyfrowy miernik uniwersalny Multi 13S**



**RCC26 supplementary set comprising a capillary tube system, R290**



**RCC26 supplementary set comprising a capillary tube system, R290**

The supplementary set comprising a capillary tube system is meant to convey the design and functions of a system found in many household refrigerators.

The following educational content is imparted:

- Design and function
- Filling, evacuation and leakage test
- Commissioning
- Influence of variations in capillary tube length
- Decommissioning

Supplementary Set comprising:

Pos.

nazwa produktu

Bestell-Nr.

Anz.

137

**Compressor kit without accumulator, 230V/50Hz R290**

CO3207-2C

1

138

**Capillary tube for regulating refrigeration systems 1,5m**

CO3207-2X

1

139

**Capillary tube for regulating refrigeration systems 2,0m**

CO3207-2Y

1

Materialy szkoleniowe:

**Materialy szkoleniowe:**

Pos.

nazwa produktu

Bestell-Nr.

Anz.

140

**Interactive Lab Assistant: Capillary tube system, R290**

SO2801-1J

1

## RCC3 Split-system air conditioners with heat pump function

### RCC3 Split-system air conditioners with heat pump function

Split-system air conditioners are used nowadays for many applications. Whether air conditioning for human comfort in private homes or commercial buildings or also for cooling small server rooms, it is common to see split-system air conditioners used.

Due to the increasing demand for such systems, demand for fitters to install, commission, maintain, troubleshoot and also to dismantle and properly recycle them is similarly rising.

**Lucas-Nülle can now offer the ideal system for efficient, professional training in split-system air conditioners. Lucas-Nülle can now offer the ideal system for efficient, professional training in split-system air conditioners.**

### RCC31 Installation of a split-system air conditioner with heat pump function

#### RCC31 Installation of a split-system air conditioner with heat pump function

The training system “RCC31 Installation of a split-system air conditioner with heat pump function” enables trainees and students to learn the key steps for the installation, commissioning and decommissioning of split air conditioners along with the requisite technical knowledge of the above and of the operating properties of the equipment.

Lista artykułów:

**Lista artykułów:**

Pos.

nazwa produktu

Bestell-Nr.

Anz.

141

**Split air conditioner training system**

CO3207-3A

1

Materiały szkoleniowe:

**Materiały szkoleniowe:**

Pos.

nazwa produktu

Bestell-Nr.

Anz.

142

**Interactive Lab Assistant: Installation of a split-system air conditioner**

SO2801-1N

1

Tools and equipment:

Pos.

nazwa produktu

Bestell-Nr.

Anz.

143

**Wagi elektroniczne, 100 kg, zasilane baterią 9 V,**

LM8581

1

144

**Bateria manometrów ze skrzynką do przechowywania i przewodem**

LM8582

1

145

**Leak detection equipment for refrigerant and technical gases**

LM8593

1

146

**Test leak for testing leak detection equipment (50ml)**

LM8594

1

147

**Power Clamp Meter with True RMS, 3 3/4-digit, 1000 A AC/DC**

LM2336	1	148
<b>Vacuum meter with setting pointer</b>		
LM8586	1	149
<b>Nitrogen pressure regulator RA825GN50, cylinder pressure 200 bars, excess pressure release at 50 bars</b>		
LM8596	1	150
<b>Cylinder connector for R134a refrigerant, 7/16" tube connector</b>		
LM8597	1	151
<b>Wysokociśnieniowy zestaw przyrządów do usuwania czynnika chłodniczego, 38,5 bara, 230 V/50...60 Hz</b>		
LM8580	1	152
<b>Schrader valve opener</b>		
LM8648	1	153
<b>Two-stage vacuum pump with oil filter</b>		
CO3207-2Z	1	154
<b>Refrigeration tool set 1, VDE basic set (20 parts) inlay size 500x450mm</b>		
ST8090-4B	1	155
<b>Refrigeration tool set 2, spanner set (12 parts) inlay size 500x450mm</b>		
ST8090-4F	1	156
<b>Refrigeration tool set 5, torque spanner set (29 parts) inlay size 500x450mm</b>		
ST8090-4K	1	157
<b>Refrigeration tool set 6, pipework set (15 parts) inlay size 500x450mm</b>		
ST8090-4M	1	158
<b>Zestaw kluczy imbusowych</b>		
LM9716	1	159

<b>MINIBEND, bending pliers, 6-8-10mm</b>	
LM8647	1
Akcesoria:	
Pos.	
nazwa produktu	
Bestell-Nr.	Anz.
	160
<b>Mobile SybaWork cabinet with drawers, 5 drawers, 600x575x790 mm</b>	
ST8070-6B	1
	161
<b>Set of copper pipes for split-system air conditioner installation</b>	
SE2675-2D	1
	162
<b>Set of cabling for installation of split-system air conditioner</b>	
SE2675-2C	1
	163
<b>Set of fastening equipment for air conditioning assembly training set similar to that illustrated</b>	
SE2675-2G	1
	164
<b>Bottle for recycling refrigerant, unfilled, T12Y/S50</b>	
LM8592	1
Opcjonalne akcesoria:	
<b>Operating materials</b>	
Pos.	
nazwa produktu	
Bestell-Nr.	Anz.
	165
<b>Uchwyt do płaskiego monitora ze składanym ramieniem, nośność do 15 kg, do zamocowania na profilu aluminiowym, VESA 75/100</b>	
ST8010-4T	1
	166
<b>PC holder for SybaPro experiment trolleys, height/width adjustable</b>	
ST7200-5F	1
	167

**D-Checker serial diagnostics cable**

LM8652

1  
168

**Ośłona ochronna do stanowisk doświadczalnych IMS 1200 mm z panelem szkoleniowym  
ST8010-8L**

1  
169

**Suva R 410A refrigerant in pressurised cylinder filled with 12.5 l of refrigerant  
LM8601**

1  
170

**Nitrogen in pressurized cylinder, 5 l  
LM8591**

1

**RCC32 Operating and malfunction responses for split-system air conditioning  
with heat pump function**

**RCC32 Operating and malfunction responses for split-system air conditioning with heat pump function**

With this equipment set users can learn about the operating characteristics of split-system air conditioning with heat pump capability. It allows for analysis of various modes using a logarithmic pressure-enthalpy (log p/h) diagram and measurement logs. Interactive fault simulation helps with the proper analysis and interpretation of various malfunctions in the system.

Lista artykułów:

**Lista artykułów:**

Pos.

nazwa produktu

Bestell-Nr.

Anz.  
171

**Training system for split air conditioning installations  
CO3207-3B**

1

Materialy szkoleniowe:

**Materialy szkoleniowe:**

Pos.

nazwa produktu

Bestell-Nr.

Anz.  
172

**Interactive Lab Assistant: Operating and malfunction responses for split-system air conditioning**

SO2801-1P

1

Tools and equipment:

Pos.

nazwa produktu

Bestell-Nr.

Anz.  
173

**Schrader valve opener**

LM8648

1

174

**Cyfrowy miernik uniwersalny Multi 13S**

LM2330

1

175

**USB cable A-B**

LM9060

1

Opcjonalne akcesoria:

Pos.

nazwa produktu

Bestell-Nr.

Anz.  
176

**Uchwyt do płaskiego monitora ze składanym ramieniem, nośność do 15 kg, do zamocowania na profilu aluminiowym, VESA 75/100**

ST8010-4T

1

177

**PC holder for SybaPro experiment trolleys, height/width adjustable**

ST7200-5F

1

178

**Ostona ochronna do stanowisk doświadczalnych IMS 1200 mm z panelem szkoleniowym**

## RCW Refrigeration workshop

### RCW Refrigeration workshop

The refrigeration workshop goes beyond the modular refrigeration training system and allows you to foster the practical skills of your trainees. It covers the topics of refrigeration and of electrical engineering. Participants in the course are guided step by step through refrigeration technology and acquire a high-quality grounding for their work in the future. Installation of coolant piping is only one of the many skills which can be learned with the help of the refrigeration workshop.



## RCW1 Design and assembly of refrigeration applications

### RCW1 Design and assembly of refrigeration applications

Equipment set RCW1-A for the refrigeration workshop allows you to teach the most important and most common applications of refrigeration technology. Thanks to the extensive equipment set, the refrigeration workshop is also suitable for teaching fundamentals of the piping system. The extensive electrical circuitry covers the broadest of application areas.

Knowledge including the following can be taught as part of fundamental practical training:

- Installing and planning technically correct piping for a refrigeration system using copper pipes (bending, flanging, making to measure)
- Installing electrical wiring for a refrigeration system and handling electric current
- Handling refrigerant, filling, disposal and safety
- Start-up, checking for leaks, leak testing and maintenance
- Disassembly or shut-down

The following projects can be completed using the basic set:

- Vegetable cooling cabinet
- Freezer compartment
- Shock freezer
- Fridge compartment with power controlled by hot-gas by-pass
- Refrigeration system with starting controller
- Refrigeration system with winter mode
- 2 Fridge compartments at different temperatures via evaporator pressure regulating valve

These topics incorporate the following skills:

- Set-up and dismantling of piping and piping components
- Pressure testing, pressure strength testing, electrical tests
- Calibration of pressure switches
- Start-up, checking for leaks, leak testing
- Designing control systems
- Calibration of pressure switches
- Filling with refrigerant
- Siphoning of refrigerant to suitable disposal containers
- Execution of repairs, e.g. replacing components, changing oil, etc.

Wyposażenie, w którego skład wchodzi:

**Wyposażenie, w którego skład wchodzi:**

Pos. nazwa produktu Bestell-Nr.	Anz.
	179
<b>Cold storage construction set (V), 2 evaporators, defrosting system, 1.5x1.5x2.45</b> SE2675-1B	1
	180
<b>SybaWork workbench, 1300x800x870mm, with punched hole panel</b> ST8070-1D	1
	181
<b>Air-cooled condenser set with additional stop-cocks (flange fittings)</b> SE2675-1E	1
	182
<b>Control cabinet for cold storage cell, all components fitted with control voltage</b> SE2675-1C	1
	183
<b>Set of cables, leads, ferrules and cable clips (for 1 work station)</b> SE2675-1D	1
	184
<b>Basic equipment set for cold storage cell project</b> SE2675-1G	1

Materialy szkoleniowe:

**Materialy szkoleniowe:**

Pos. nazwa produktu Bestell-Nr.	Anz.
	185
<b>Interactive Lab Assistant: Assembly and commissioning of refrigeration systems</b> SO2801-1X	1

Operating materials

Tools and equipment:

**Matching ST8070-6F: three inserts can be accommodated in each drawer**

Pos.

nazwa produktu

Bestell-Nr.

Anz.

186

**Vacuum meter with setting pointer**

LM8586

1

187

**Vacuum pump, dual-stage rotary vane pump, RZ2.5, with exhaust filter, 230V/50-60**

LM8595

1

188

**Wysokociśnieniowy zestaw przyrządów do usuwania czynnika chłodniczego, 38,5 bara, 230 V/50...60 Hz**

LM8580

1

189

**Nitrogen pressure regulator RA825GN50, cylinder pressure 200 bars, excess pressure release at 50 bars**

LM8596

1

190

**Cylinder connector for R134a refrigerant, 7/16" tube connector**

LM8597

1

191

**Leak detection equipment for refrigerant and technical gases**

LM8593

1

192

**Test leak for testing leak detection equipment (50ml)**

LM8594

1

193

**2-kanalowy termometr różnicowy z wyświetlaczem i złączem do czujników radiowych**

LM8575

1

194

**Ośłona ochronna TopSafe do 2-kanalowego termometru różnicowego**

LM8576

1

195

**Czujnik powierzchniowy typu K z bardzo dużą końcówką pomiarową, wodoszczelny**

LM8577

1

196

**Stykowy czujnik rurkowy typu K z wymiennymi końcówkami pomiarowymi do 5..65-mm pi**  
LM8578

1

197

**Bateria manometrów ze skrzynką do przechowywania i przewodem**  
LM8582

1

198

**Mobile work bench SybaWork, 3 drawers, 1005 x 736 x 519, table top 25 mm**  
ST8070-6F

1

199

**Refrigeration tool set 1, VDE basic set (20 parts) inlay size 300x600mm**  
ST8090-4A

1

200

**Refrigeration tool set 2, fine mechanics set (22 parts) inlay size 300x600mm**  
ST8090-4C

1

201

**Refrigeration tool set 2, spanner set (12 parts) inlay size 300x600mm**  
ST8090-4E

1

202

**Refrigeration tool set 4, mechanics set (6 parts) inlay size 300x600mm**  
ST8090-4G

1

203

**Refrigeration tool set 5, torque spanner set (29 parts) inlay size 300x600mm**  
ST8090-4J

1

204

**Refrigeration tool set 6, pipework set (15 parts) inlay size 300x600mm**  
ST8090-4L

1

205

**Refrigeration tool set 7, levels and bending pliers set (5 parts) inlay size 300x600mm**  
ST8090-4N

1

206

**Socket spanner set 1/4" + 1/2" (46 items)**  
ST8090-4Q

1

Akcesoria:

**Materials for attachment and assembly**

This set consists of consumable materials in sufficient quantity to provide for all the needs of a single work station over a period of two years.

Pos.

nazwa produktu

Bestell-Nr.

Anz.

207

**Set of copper pipes, various widths, for project assembling (2 places)**

SE2675-1H

1

208

**Pipe connector set for components with flare fittings**

SE2675-2P

1

209

**Set of fasteners for pipes on component bases**

SE2675-2N

1

210

**Set of 25 fasteners for wires and components**

SE2675-2M

1

211

**Bottle for recycling refrigerant, unfilled, T12Y/S50**

LM8592

1

Opcjonalne akcesoria:

**Operating materials**

Pos.

nazwa produktu

Bestell-Nr.

Anz.

212

**Refrigerant, Suva 134a in pressurised cylinder, contents 12,5l**

LM8590

1

213

**Pressurised cylinder filled with 12.5 l of Suva R 404A refrigerant**

LM8599

1

214

**Nitrogen in pressurized cylinder, 5 l**

LM8591

## RCW2 Design and assembly of advanced refrigeration applications

### RCW2 Design and assembly of advanced refrigeration applications

Use of this supplementary set requires that basic knowledge has already been learned and the set is conceived for the purpose of special technical training. Additional components allow for more systems to be explored. For instance, multiple refrigeration compartments can be operated in conjunction with a single control system. This allows the individual cold chambers to be operated at differing temperatures depending on the applications for which they are used.

Follow-up projects to supplement the basic set:

- Refrigeration compartment with power regulation by hot-gas by-pass and post-injection
- Air-conditioned space with differing temperatures
- Processing of refrigerant via heat exchangers, liquid/oil traps
- Switching between cooling and heating operation and defrosting by means of four-way valve
- Use of various refrigeration controllers with and without real-time clock

Uzupełnienie do wyposażenia podstawowego:

#### Uzupełnienie do wyposażenia podstawowego:

Pos.

nazwa produktu

Bestell-Nr.

Anz.

215

#### Heat exchanger

SE2675-1K

1

216

#### Liquid trap

SE2675-1L

1

217

#### Four-way valve

SE2675-1M

1

218

#### Oil trap

SE2675-1N

1

219

#### LCLE expansion valve

SE2675-1P

1

	220
<b>PWM-type electronic expansion valve EEV PT</b> SE2675-1Q	1
	221
<b>PWM-type electronic expansion valve EEV TT</b> SE2675-1R	1
	222
<b>Continuously controlled expansion valve, EEVEX4</b> SE2675-1S	1
	223
<b>Continuous overheating controller</b> SE2675-1T	1
	224
<b>Continuous pressure regulator with EX4 valve</b> SE2675-1U	1
	225
<b>Continuous pressure regulator with EX6 valve</b> SE2675-1V	1
	226
<b>DIXELL cold room regulator</b> SE2675-1W	1
	227
<b>Universal cold room regulator with real-time clock</b> SE2675-1X	1
 Materialy szkoleniowe: <input type="text"/>	
<b><u>Materialy szkoleniowe:</u></b>	
Pos. nazwa produktu Bestell-Nr.	Anz.
	228
<b>Interactive Lab Assistant: Assembly and commissioning of enhanced refrigeration systems</b> SO2801-1Y	1

## RMW 1 mechanical proficiencies in the refrigeration sector

### RMW 1 mechanical proficiencies in the refrigeration sector

The manual skills necessary for working in the refrigeration workshop should be taught in the mechanical workshop. All of the skills, starting with the basics of working metal materials with files and saws up to fabricating smaller workpieces with soldered and crimped connections, can be taught in the mechanical systems workshop. A possible final exercise here could be constructing workpieces involving pressure switches and electrical wiring.

The RMW1 equipment package includes work benches and furniture for the workshop. The workshop should be equipped with a supply of gas for soldering work and leak testing beforehand. The equipment package does not contain any soldering accessories or soldering consumables, however.

An extraction system for removing soldering gases must be provided for on site too. Lucas-Nülle can put you in contact with one of our partner companies to help you with this.

### Soldering stations

#### Soldering stations

Those technical soldering skills which are important for refrigeration/air conditioning technicians are to be taught at soldering stations. Beginning with basic handling of metals and extending to the manufacture of small components with soldered and flared connections, all the essentials of brazing and soldering with copper piping can be taught in the soldering workshop.

The equipment in the soldering stations includes local extraction fittings, gas supply equipment along with work benches and soldering equipment.

The following prerequisites for operation of the workstations need to be fulfilled within the building where they are located:

- Central extraction and filtering system for connection to the soldering columns
- Central gas supply for soldering work and checks for gas-tightness to be connected to the soldering columns

Lucas Nülle GmbH is happy to provide advice according to your needs.



Wyposażenie, w którego skład wchodzi:

**Wyposażenie, w którego skład wchodzi:**

Pos. nazwa produktu Bestell-Nr.	Anz. 229
<b>Soldering column with 4 gas supply locations and extractor arms</b> SE2675-3A	1 230
<b>Gas economiser</b> SE2675-3C	4 231
<b>Soldering bench with grating stand</b> SE2675-3D	4 232
<b>Welding attachment for out-of-position welding</b> SE2675-3E	4 233
<b>Aluminium flooring</b> SE2675-3F	8 234
<b>Connecting hose 2 m</b> LM8631	8 235
<b>Brazing equipment with sheet steel boxing, oxygen-propane</b> LM8633	4 236
<b>Gas igniter</b> LM8634	4 237
<b>Quenching tanks</b> SE2675-3G	1

Opcjonalne akcesoria:

Pos.

nazwa produktu

Bestell-Nr.

Anz.

238

### Connecting hoses

LM8632

1

239

### Local extractor for soldering station

LM8636

1

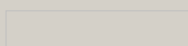
240

### Soldering column with 2 extractors and extractor arms

SE2675-3B

1

## Workshop set



### Workshop set

Apart from soldering work, metalworking is another of the skills essential to refrigeration engineers. This workshop set supplements the soldering stations with the necessary furnishings, tools and workshop equipment for teaching the mechanical skills needed for refrigeration technology.

The workshop set also allows for the possibility of preparing or subsequently modifying workpieces to be soldered at the soldering stations.

The following prerequisites for operation of the workshop must already be present in the building:

- Sub-distribution box for workshop benches
- Three-phase connector for bench-mounted drill
- Storage for copper pipes, such as wall mounts for rods and coiled tubes

Lucas Nülle GmbH would be happy to provide you with advice on these aspects.

Wyposażenie, w którego skład wchodzi:

**Wyposażenie, w którego skład wchodzi:**

Pos. nazwa produktu Bestell-Nr.	Anz.
	241
<b>SybaWork workbench, 1500x750x859, 6 drawers, 1/2 shelf, multiplex table top 40mm</b> ST8070-2C	1 242
<b>SybaWork workbench, 1500x750x859mm, shelf, multiplex table top, 40mm</b> ST8070-1A	1 243
<b>Mobile SybaWork cabinet with drawers, 5 drawers, 600x575x790 mm</b> ST8070-6B	1 244
<b>Work swivel stool with continuous height adjustment via gas lift, casters: plastic wheels</b> ST7004-5B	1 245
<b>Parallel vice with rigid tubing jaws, width 120 mm</b> ST8080-2A	1 246
<b>Fold-away and height adjustment equipment for ST8080-2A</b> ST8080-2C	1 247
<b>Mounting screw kit for vice ST8080-2A, for worktops with 40mm thickness</b> ST8080-2D	1 248
<b>Ergo45° 3 HU power duct, 580 mm, for table-top mounting, 114 PU</b> ST8033-3V	1 249
<b>Full-width front plate (type 1) for six-sided power supply duct 114PU</b> ST8070-4C	1

Tools for the mechanical workshop

**Tools for the mechanical workshop**

Pos.

nazwa produktu

Bestell-Nr.

Anz.

**Refrigeration tool set 1, VDE basic set (20 parts) inlay size 300x600mm**

ST8090-4A

250

1

251

**Refrigeration tool set 2, fine mechanics set (22 parts) inlay size 300x600mm**

ST8090-4C

1

252

**Refrigeration tool set 2, spanner set (12 parts) inlay size 300x600mm**

ST8090-4E

1

253

**Refrigeration tool set 4, mechanics set (6 parts) inlay size 300x600mm**

ST8090-4G

1

254

**Refrigeration tool set 5, torque spanner set (29 parts) inlay size 300x600mm**

ST8090-4J

1

255

**Refrigeration tool set 6, pipework set (15 parts) inlay size 300x600mm**

ST8090-4L

1

256

**Refrigeration tool set 7, levels and bending pliers set (5 parts) inlay size 300x600mm**

ST8090-4N

1

257

**Socket spanner set 1/4" + 1/2" (46 items)**

ST8090-4Q

1

258

**Vertical drilling machine, ALZMETALL Alzstar 23/S (including chuck)**

ST8080-3C

1

259

**Woltomierz, czujnik faz, czujnik ciągłości obwodów i wskaźnik kierunku wirowania pola do 400 V**

LM8554

1

260

<b>Flare drill set for copper piping</b> LM8637	1 261
<b>Expander set for copper piping</b> LM8638	1 262
<b>Vice</b> LM8639	1 263
<b>Gripping pliers</b> LM8640	1 264
<b>Sealing grip pliers</b> LM8641	1 265
<b>Guillotine with underframe</b> SE2675-3H	1 266
<b>Calibration tool set for copper</b> SE2675-3J	1
Akcesoria: Pos. nazwa produktu Bestell-Nr.	Anz. 267
<b>Waste bin, 95-l capacity approx., silver-grey, 660/870mm</b> ST8070-8D	1 268
<b>Set of cleaning equipment</b> ST8070-8F	1 269
<b>Large workshop cabinet, 4 shelves (loading capacity 120kg), 1950x1200x500 mm</b> ST8070-7J	1 270
<b>Mobile workbench SybaWork, 1200x750x859, shelf, 4 casters, top 40 mm</b> ST8070-6G	1

271

**Trolley including open-front storage bins, 1150x620x1570mm**

ST8070-6E

1

272

**High-speed steel spiral drill set, 25 drills, from 3 mm diameter increasing in 0.5 mm steps**

ST8070-5D

1

273

LM8635

1

274

**Base for 50 kg anvil**

LM8643

1

275

**Waste collector set, red with trolley underframe**

SE2675-3K

1

276

**Consumables for mechanical workshop (16 stations)**

SE2675-2E

1

## Tools, work benches and workshop equipment for refrigeration technology

### Tools, work benches and workshop equipment for refrigeration technology

The tool sets for refrigeration technology are based on the curriculum and assembled in cooperation with various teaching establishments and with the family firm ELORA-Werkzeuge, which has been making versatile hand tools entirely in Germany since 1924. The sets therefore reflect the tools that students will really use in their careers as refrigeration technicians.

The tools are precisely matched to the laboratory and workshop equipment. This means that tools are immediately ready to hand during lessons. Every tool has its own place in the inlays which match the dimensions of all the drawers along with a label describing its own dimensions.

The tool sets supplement Lucas-Nülle's laboratory and workshop equipment and make it possible to obtain all the necessary equipment from a single source with every component complementing the others perfectly.

Mobile workbench with tool sets specifically designed for refrigeration technology

**Mobile workbench with tool sets specifically designed for refrigeration technology**

**Matching ST8070-6F: three inserts can be accommodated in each drawer**

Pos.

nazwa produktu

Bestell-Nr.

Anz.  
277

**Mobile work bench SybaWork, 3 drawers, 1005 x 736 x 519, table top 25 mm**

ST8070-6F

1  
278

**Refrigeration tool set 1, VDE basic set (20 parts) inlay size 300x600mm**

ST8090-4A

1  
279

**Refrigeration tool set 2, fine mechanics set (22 parts) inlay size 300x600mm**

ST8090-4C

1  
280

**Refrigeration tool set 2, spanner set (12 parts) inlay size 300x600mm**

ST8090-4E

1  
281

**Refrigeration tool set 4, mechanics set (6 parts) inlay size 300x600mm**

ST8090-4G

1  
282

**Refrigeration tool set 5, torque spanner set (29 parts) inlay size 300x600mm**

ST8090-4J

1  
283

**Refrigeration tool set 6, pipework set (15 parts) inlay size 300x600mm**

ST8090-4L

1  
284

**Refrigeration tool set 7, levels and bending pliers set (5 parts) inlay size 300x600mm**

ST8090-4N

1  
285

**Socket spanner set 1/4" + 1/2" (46 items)**

ST8090-4Q

1

Workbench with tool sets specifically designed for refrigeration technology

### Workbench with tool sets specifically designed for refrigeration technology

The modular work bench can be stowed under other benches. Once pulled out, it acts as an additional storage surface. The tool sets are matched to the individual courses.

Tool inserts of differing sizes can be matched to the variously sized drawers in the cupboards. Any spare space can be filled up with dummy inserts if needed.

Pos.

nazwa produktu

Bestell-Nr.

Anz.

286

### SybaWork chest of drawers, 555x736x819, 5 drawers with central lock

ST8070-7B

1

287

### Refrigeration tool set 1, VDE basic set (20 parts) inlay size 500x450mm

ST8090-4B

1

288

### Refrigeration tool set 2, fine mechanics set (22 parts) inlay size 500x450mm

ST8090-4D

1

289

### Refrigeration tool set 2, spanner set (12 parts) inlay size 500x450mm

ST8090-4F

1

290

### Refrigeration tool set 4, mechanics set (6 parts) inlay size 500x450mm

ST8090-4H

1

291

### Refrigeration tool set 5, torque spanner set (29 parts) inlay size 500x450mm

ST8090-4K

1

292

### Refrigeration tool set 6, pipework set (15 parts) inlay size 500x450mm

ST8090-4M

1

293

### Refrigeration tool set 7, levels and bending pliers set (5 parts) inlay size 500x450

ST8090-4P

1

294

### Socket spanner set 1/4" + 1/2" (46 items)

ST8090-4Q



## Workshop equipment specifically for refrigeration workshop.

## Workshop equipment specifically for refrigeration workshop.

Wyposazenie, w którego sklad wchodzi:

### Wyposazenie, w którego sklad wchodzi:

Pos.

nazwa produktu

Bestell-Nr.

Anz.

295

**Large workshop cabinet, 4 shelves (loading capacity 120kg), 1950x1200x500 mm**

ST8070-7J

1

296

**Waste bin, 95-l capacity approx., silver-grey, 660/870mm**

ST8070-8D

1

297

**Trolley including open-front storage bins, 1150x620x1570mm**

ST8070-6E

1

298

**Folding work platform, 2x3 levels**

ST8070-8E

1

299

**Trolley, 400 kg , 995x695 mm, 3 steel troughs**

ST8070-6D

1

300

**Set of cleaning equipment**

ST8070-8F

1

Opcjonalne akcesoria:

Pos.

nazwa produktu

Bestell-Nr.

Anz.

301

**Mobile SybaWork cabinet with drawers, 5 drawers, 600x575x790 mm**

ST8070-6B

1