

# An Overview on the Structure and Contents of the Vocational Training and Further Education in the RAC sector in Germany

## 德国空调制冷职业教育的体系和模式

9 April 2019

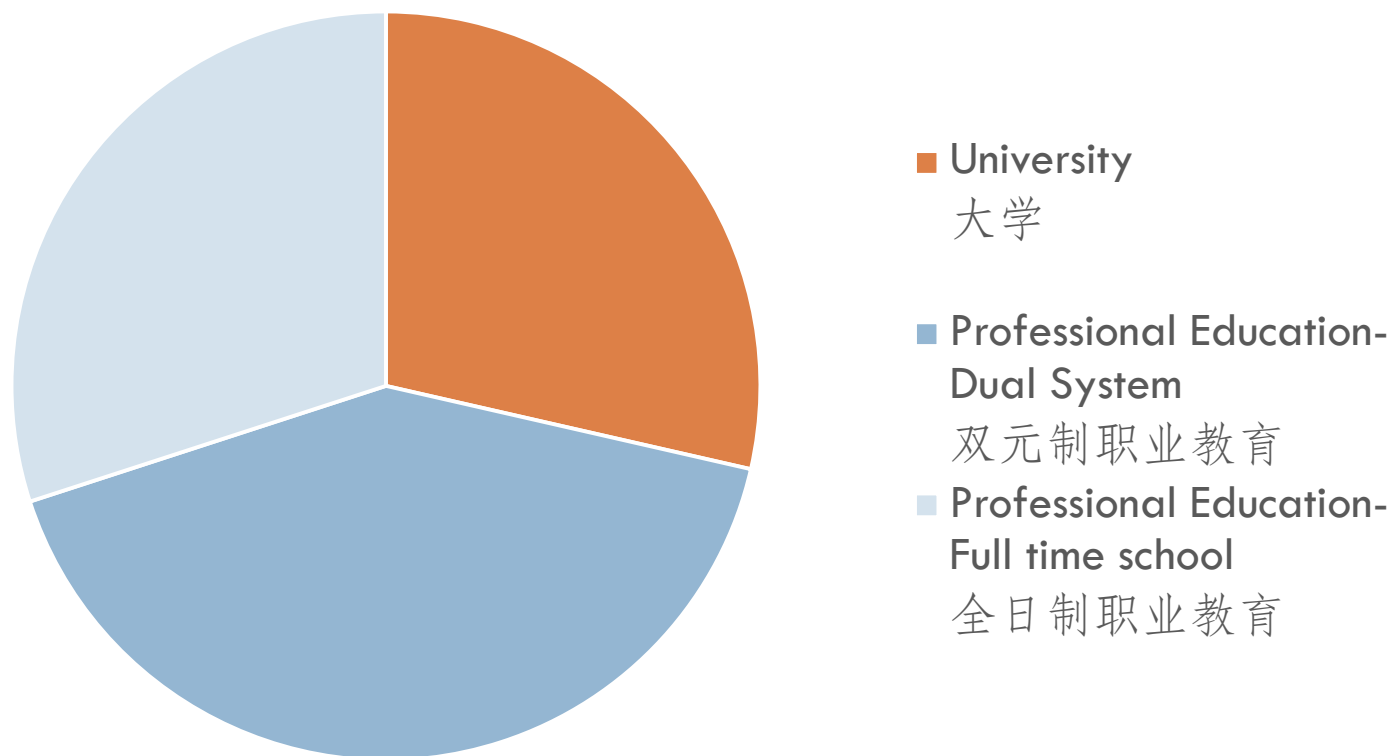
Refrigeration and Air Conditioning Exhibition, Shanghai

Speaker: Jörg Peters, General Director of Guild of Refrigeration and Air Conditioning of the Federal States of Hesse, Thuringia and Baden Württemberg, Germany

约尔格·彼得斯,  
德国联邦空调制冷学院校长 董事长



- **The 'Dual System of Vocational Training' in Germany**  
德国的“双元制职业教育体系”
- **Inter-Company Training**  
跨企业培训
- **The Role of the Guild of Refrigeration and Air Conditioning**  
空调制冷行业协会的作用
- **Educational Institutions, Structure and Activities**  
德国联邦空调制冷学院-结构和功能介绍
- **Vocational Training in the RAC Sector**  
空调制冷领域的职业培训
- **Cooperating Partners and Services**  
合作伙伴和服务



## Dual System of Vocational Training

**349 qualified professions - duration: between 2 and 3.5 years**

双元制职业教育 349个国家认可的教育培训职业（专业）－学制：2至3.5年

# Dual System of Vocational Training 双元制职业教育



Dual System means = combination of hands-on training at a company and classroom learning at state-run vocational or private vocational schools

双元制=企业培训与（公立和私立）职业学校教育相结合。

- 1 or 2 days a week 每周1或2天
- blocks of several weeks (RAC sector) 数周的模块化学习（RAC领域）

- Subjects:
  - directly applicable to occupation 岗位能力要求零距离
  - general education subjects 通识课程

学科



school authorities in federal states are  
responsible for curriculum

联邦州学校主管部门负责课程内容



## Company Training: 公司培训:

- Trainee applies classroom knowledge  
学生实践应用课堂知识
- Follows example of co-workers  
向同事学习
- Performs tasks according to increasing ability  
根据能力发展规划学习型工作任务
- Keeps weekly journals  
记录学习过程
- Mastercrafts person organizes training  
企业获得“师傅”头衔的专家组织培训

regulated by the Vocational Training Act of  
Federal Ministry of Economics and Labor



受联邦经济和劳动部职业教育法的约束



Trainee has to sit one exam; divided into two parts 学生  
必须参加考试，分为两部分

1. PART 1 - in middle of program 中期考试

- counts 30% towards final grade

占最终成绩30%

2. Part 2 - at the end of program 毕业考试

- counts 70% towards final grade

占最终成绩70%

Exam consist of written, oral and practical elements



known as 'journeyperson's tests

考试由书面、口头和实践任务三部分组成。被称为“满师学徒”考试



## The third element: **Inter-Company Training**

第三元：跨企业培训

- **Practical workshops of one or two weeks per year**

每年一到两周的实践培训

- **Run by guilds or chambers of commerce**

由行会或商业协会组织

- **Result: same required skills are taught**

结果：国家课程标准规定的内容得到传授

- **Regardless of size and location of company**

与培训企业的规模和地点没有关联



The three goals of dual vocational training refer to:  
双元制职业教育的三个目标：

1. The individual dimension aims at 个性维度的目标
  - developing skills needed on the job 培养工作所需的技能
  - providing opportunity 提供机会
  - increasing self-efficiency and motivation 提高自我效率和学习动力
2. The social dimension aims at 社会维度的目标
  - guaranteeing permeability 保证教育体系的渗透性
  - integrating younger generation 青年的社会融入
3. The economic dimension aims at 经济维度的目标
  - ensuring adequate skills qualifications 确保足够的技能资格
  - providing supply of workers 提供熟练技工
  - promoting incremental innovations 促进渐进式创新



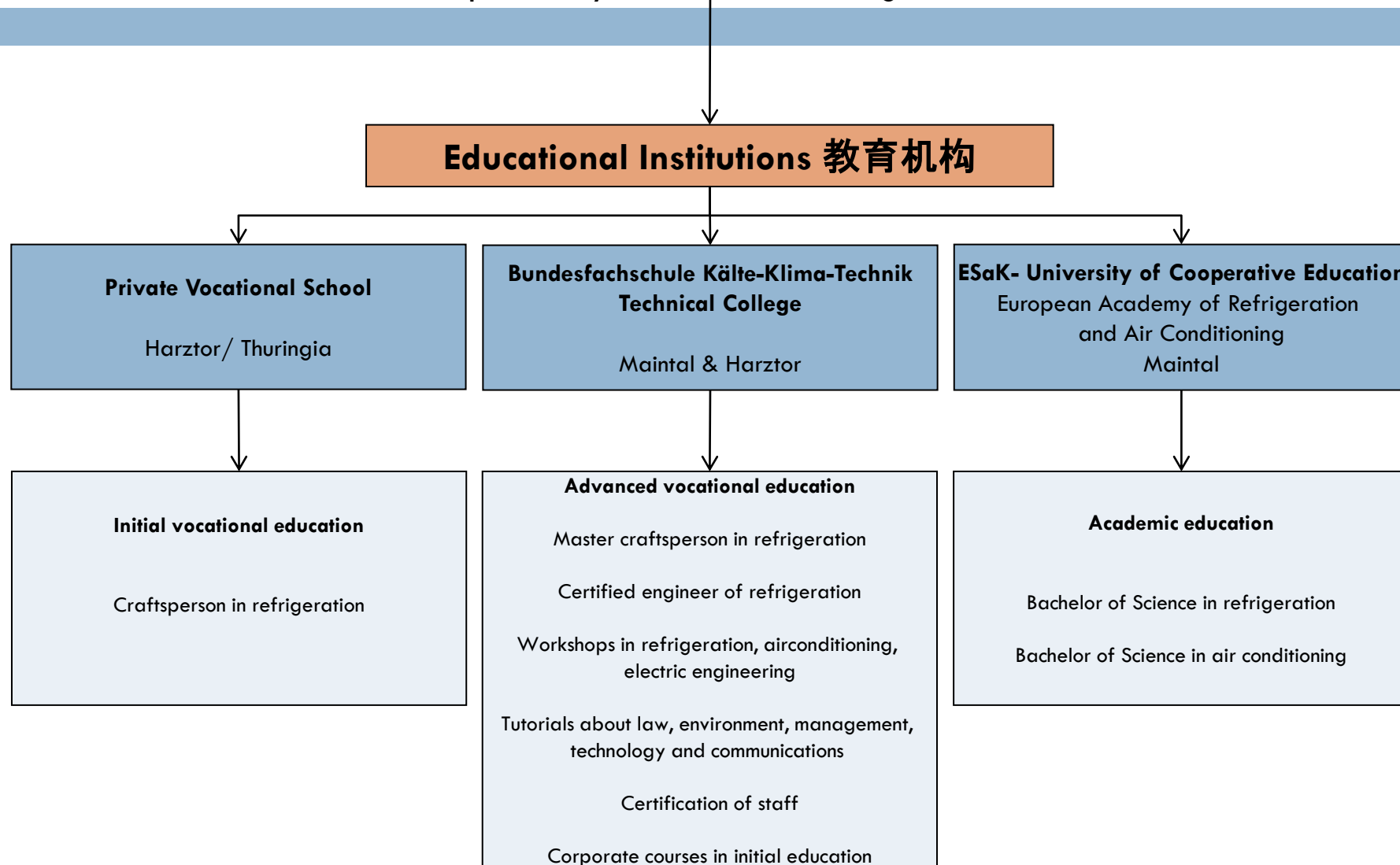


# Training in the RAC Sector

德国联邦空调制冷学院—RAC领域的培训

## The Guild of Refrigeration and Air Conditioning

Supervisory Board and Management



# Training in the RAC Sector

## RAC领域的培训



### Private Vocational School 私立职业学校

Harztor / Thuringia

- **Duration of Initial Training: 3.5 years**  
初级培训学制：3.5年
- **5 learning areas for the first year:** 第一个学年5个学习领域
  1. **Analysing RAC systems and testing**  
分析空调制冷系统和测试
  2. **Manufacturing of RAC parts**  
空调制冷零部件的制作
  3. **Inspection and testing of electrical system components**  
检查和测试电气系统组件
  4. **Planning and performing of of electrical installations**  
设计和布局电气装置
  5. **Maintaining refrigeration, air conditioning and electrical parts**  
维护制冷，空调和电气部件



## Inter-Company Training 公司间培训

Bundeschule Maintal & Harztor

1. **Basic course refrigeration (1st year – 2 weeks)**  
基础制冷课程（第1年-2周）
  - joining techniques and electrical engineering 管路加工和电气工程
2. **Refrigeration and air conditioning 1 (2nd year – 1 week)**  
制冷和空调1（第2年-1周）
  - electrical and control engineering 1 电气与控制工程1
3. **Refrigeration and air conditioning 2 (3rd year – 1 week)**  
制冷和空调2（第3年-1周）
  - environmental protection and disposal 环境保护与处置
4. **Refrigeration and air conditioning 3 (4th year – 2 weeks)**  
制冷和空调3（第4年-2周）
  - building a system 搭建一个空调制冷系统
5. **Refrigeration and air conditioning 4 (4th year – 1 week)**  
制冷和空调4（第4年-1周）
  - electrical and control engineering 2 电气与控制工程2
6. **Environmental protection**  
环境保护
  - flammable refrigerants, carbon dioxide & the role of the RAC sector  
易燃制冷剂、二氧化碳及其在RAC领域的角色







# Training in the RAC Sector

## RAC领域的培训



### Bundeschule Kälte-Klima-Technik

Technical College BFS 空调制冷职业学校

Maintal & Harztor & Leonberg

- **Master craftsperson in refrigeration 制冷领域“大师傅”**
  - Full-time, part-time & blocks of several weeks 全职，兼职&短期集训课程
  - Enables to head a department or found a company 能够领导一个部门或创立公司
  - Enables to train apprentices 能够培训学徒
- **Certified engineer of refrigeration and air conditioning technology 制冷和空调技术认证工程师**
  - 2-year program 两年制课程
  - Covers electrical engineering, IT, control systems, designing and planning of systems, introduces research and development  
涵盖电气工程，IT，控制系统，系统设计和规划，研发方向指导
  - Offers skills in business administration and project management  
提供工商管理 and 项目管理方面的技能

# Training in the RAC Sector

## RAC领域的培训



### Bundeschule Kälte-Klima-Technik

Technical College BFS 空调制冷职业学校

Maintal & Harztor & Leonberg

- Workshops in refrigeration, airconditioning, electric engineering  
制冷、空调、电气工程车间
- Tutorials about law, environment, management, technology and communications  
关于法律，环境，管理，技术和通信的课程
- Certification of staff  
员工认证
- Corporate courses in initial education  
初级培训的企业课程



# Training in the RAC Sector

## RAC领域的培训



ESaK – European Academy of Refrigeration and  
Air Conditioning, ESAK - 欧洲制冷与空调学会  
University of Cooperative Education 合作教育大学

- Duration: 3 years 学制：3年
- Degree: Bachelor of Science in refrigeration or air conditioning  
学位：制冷或空调理学学士
- Alternating theoretical and practical phases 理论和实践交替
- Closely knit cooperation between classroom and company learning  
课堂学习与公司实践紧密结合
- Companies bear some of the costs 公司承担部分费用
- Students emerge as well-trained professionals  
学生成为训练有素的专业人士

# Training in the RAC Sector

## RAC领域的培训



### Bundeschule Kälte-Klima-Technik

Technical College BFS 空调制冷职业学校

Maintal & Harztor & Leonberg

#### Company-Specific Training Programs 公司特定培训计划

- Workshops in refrigeration, airconditioning, electric engineering  
制冷、空调、电气工程车间
  - Tutorials about law, environment, management, technology and communications  
关于法律，环境，管理，技术和通信的教程
  - Certification of staff 员工认证
  - Corporate courses in initial education 初级培训的企业课程  
cost and time effective 成本和时间效益
- ➡ designed around practical needs and requirements  
根据实际需要和要求设计

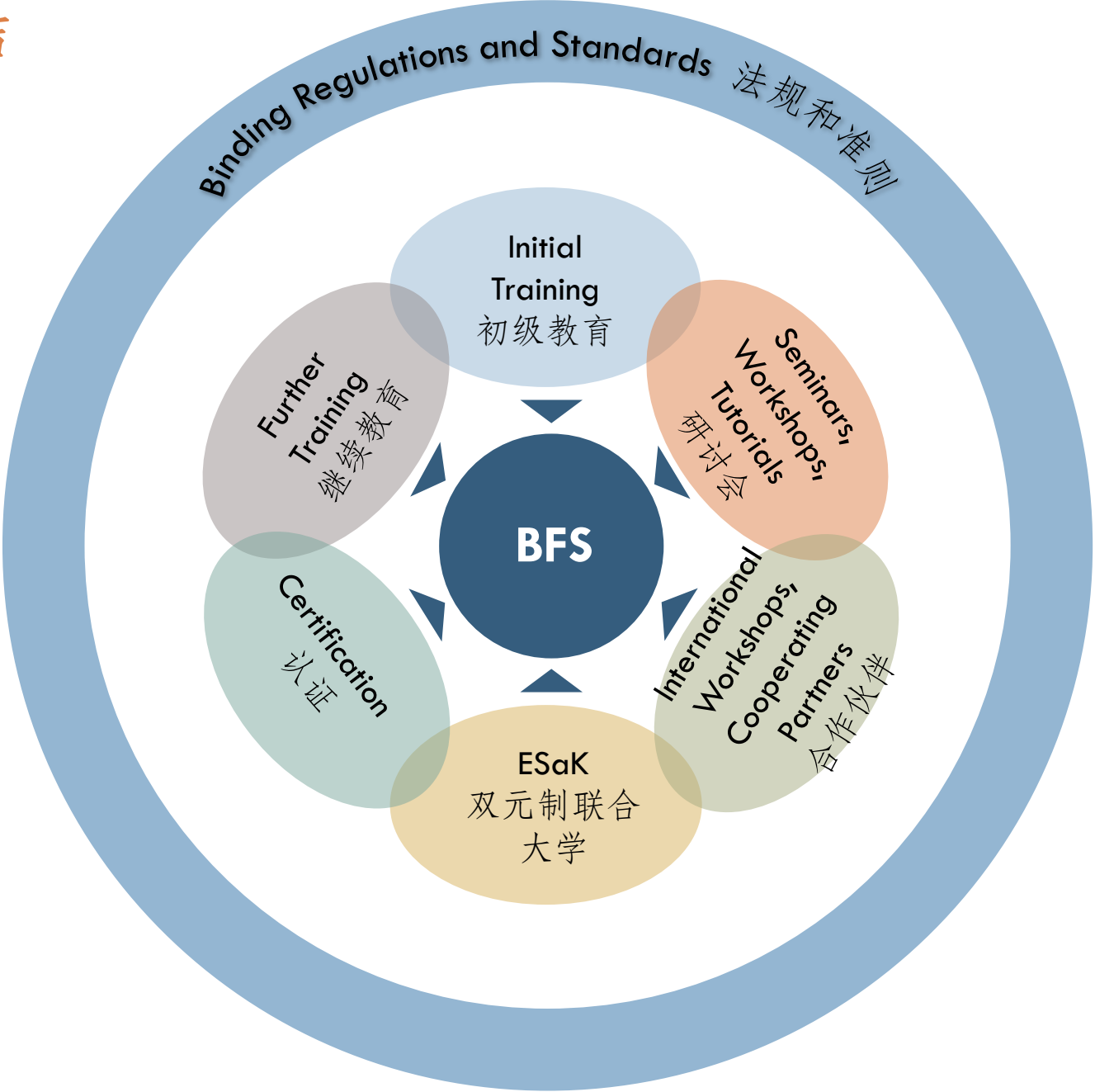


### International Workshops and Cooperating Partners

#### 国际研讨会和合作伙伴

- **UN Environment and GIZ** 联合国环境与GIZ
  - **Training courses in Germany – participants from all over the world**  
德国的培训课程——来自世界各地的学员
  - **Train-the-Trainer and technicians workshops worldwide**  
全球培训师和技术人员研讨会
  - **Seminars on standards and certification** 关于标准和认证的研讨会
  - **Training videos on best practices and flammable refrigerants**  
有关最佳实操和易燃制冷剂的培训视频
- **Lucas-Nülle** 德国陆科思德教育集团
  - **Successful cooperation since 2009** 自2009年开始合作
  - **Developing and distributing teaching materials**  
合作研发和推广空调制冷课程和教学系统

# Summary 总结





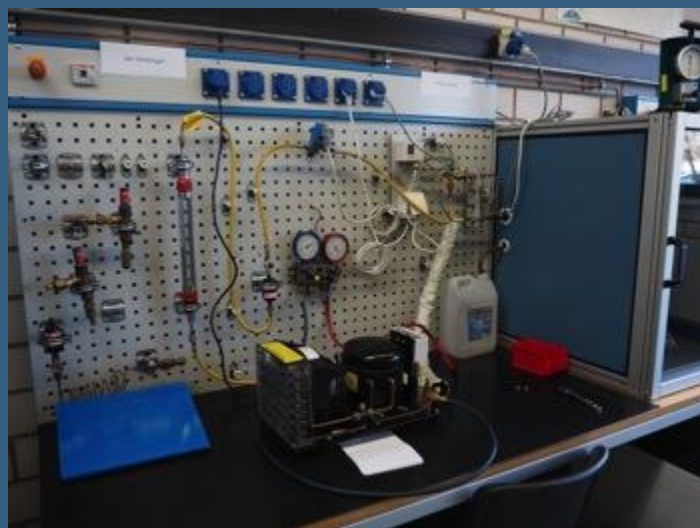
THANK YOU  
FOR YOUR ATTENTION  
感谢您的关注！



## Refrigeration Laboratory 制冷实验室







## Workshops 实训室











国内合作伙伴：

## 德国陆科思德教育集团（大中华区）

联系人： 聂磊 博士

联系方式： 185 0211 4022

邮箱： [lei.nie@lucas-nuelle.com](mailto:lei.nie@lucas-nuelle.com)

地址： 上海市浦东新区东方路69号裕景国际商务广场2111室