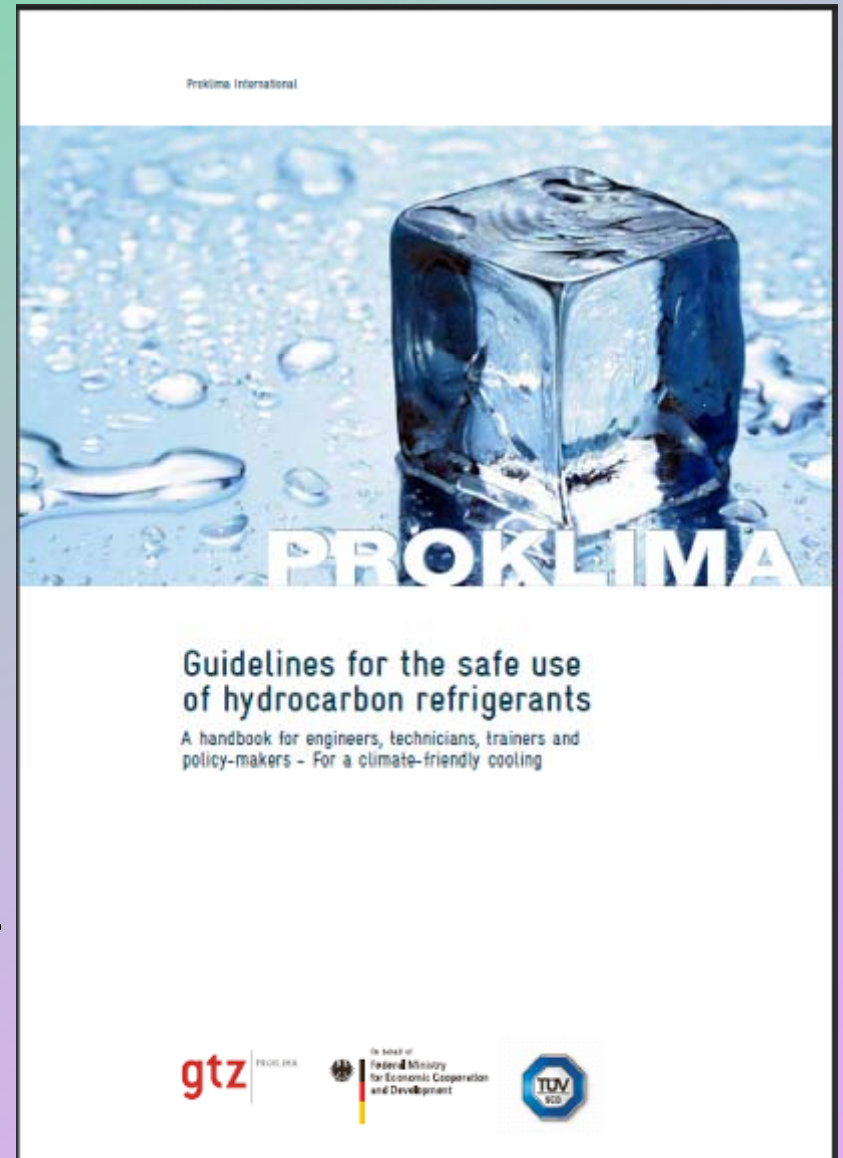


Guidelines for the safe use of hydrocarbon refrigerants

*A handbook for engineers,
technicians, trainers, and policy-
makers*

Objectives and elements of the handbook

Daniel Colbourne



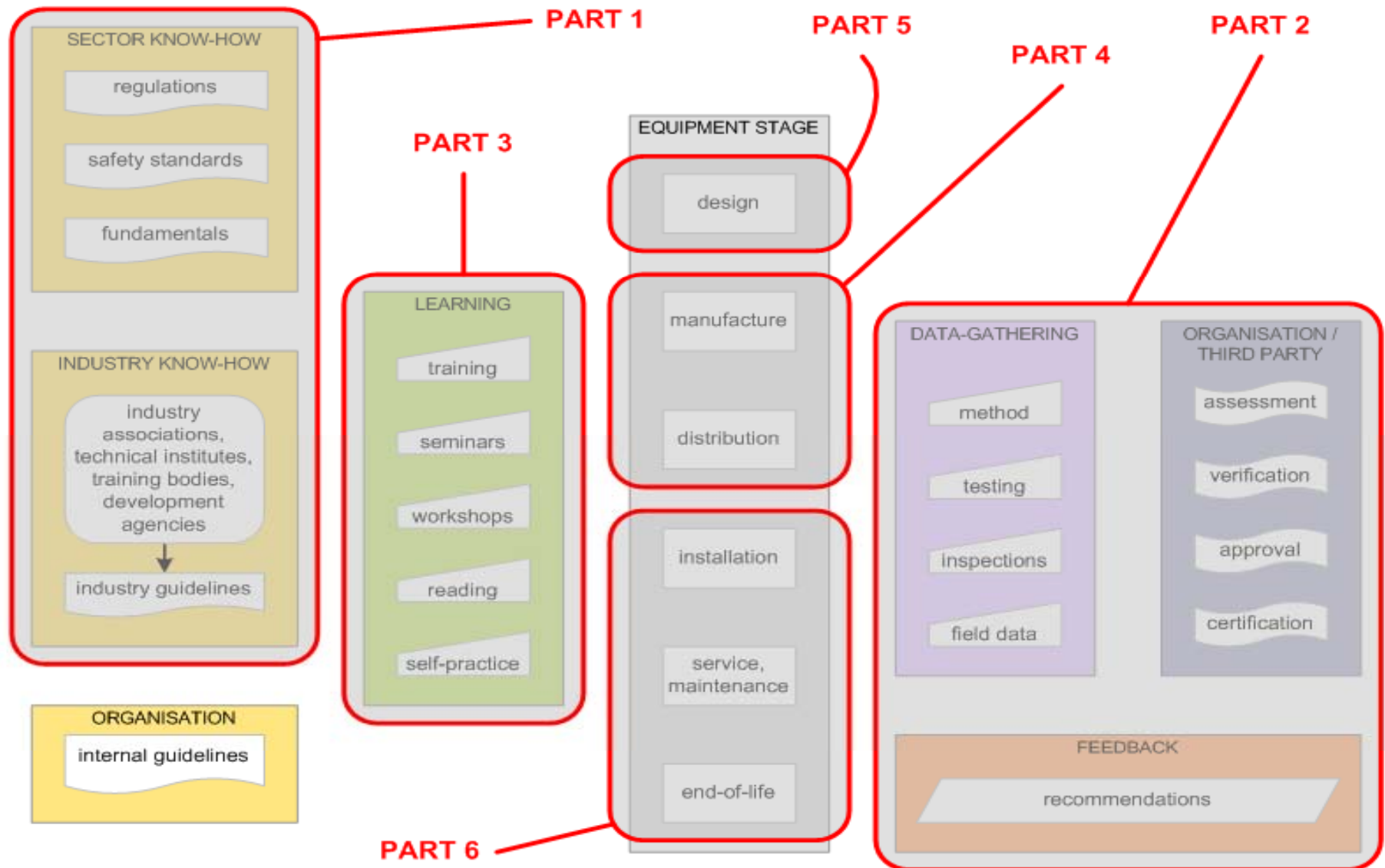
GTZ Proklima hydrocarbon safety handbook

Purpose

- Much of the information relating to safe use of HCs is widely dispersed or difficult to find
 - Standards, industry guidelines, technical papers, service handbooks, textbooks, etc
 - Also, interpretation of rules is rarely easy
- Therefore, purpose of GTZ handbook is to provide a compilation of all relevant information, provide interpretation and fill the gaps relevant to all levels and stages
- Jointly produced with TÜV Süd to ensure safety issues are handled at highest level

GTZ Proklima hydrocarbon safety handbook

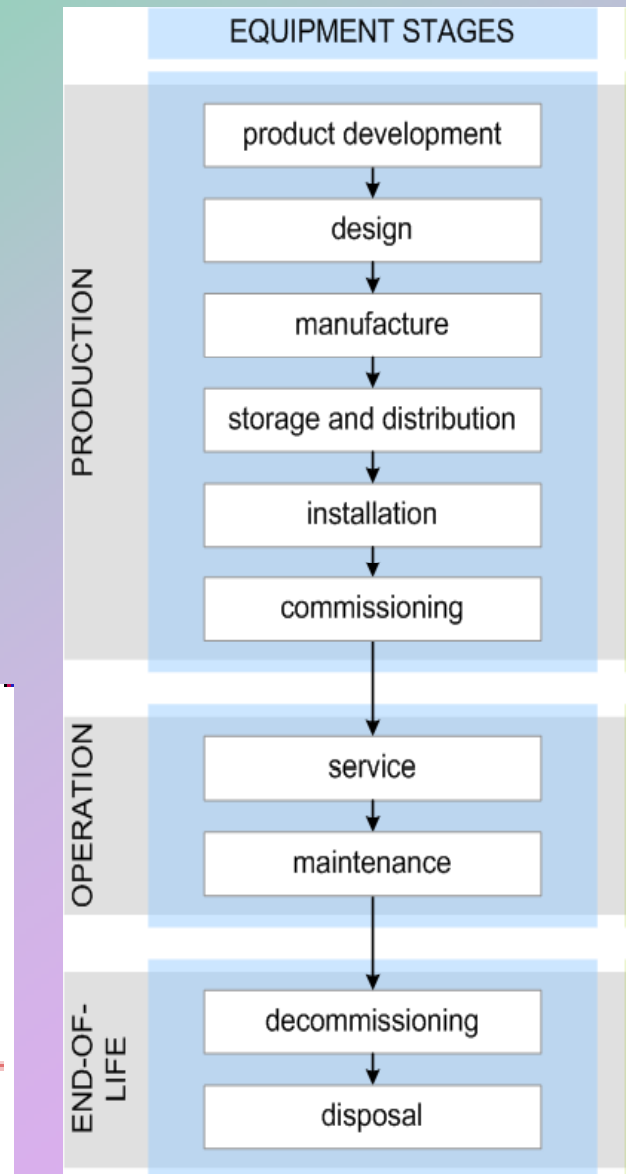
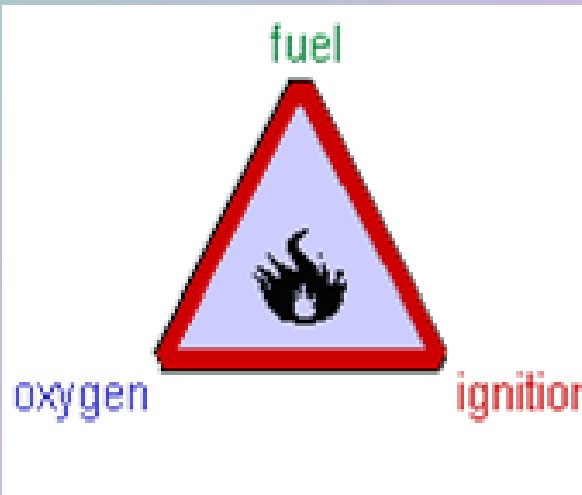
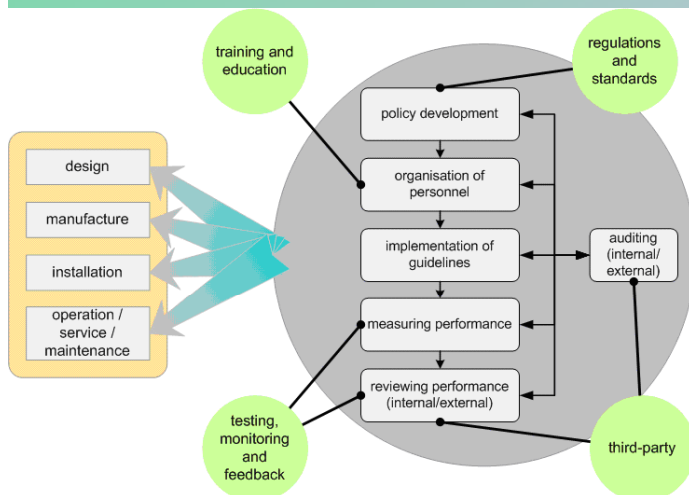
Supporting activities for lifetime of equipment



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Part 1: Safety infrastructure

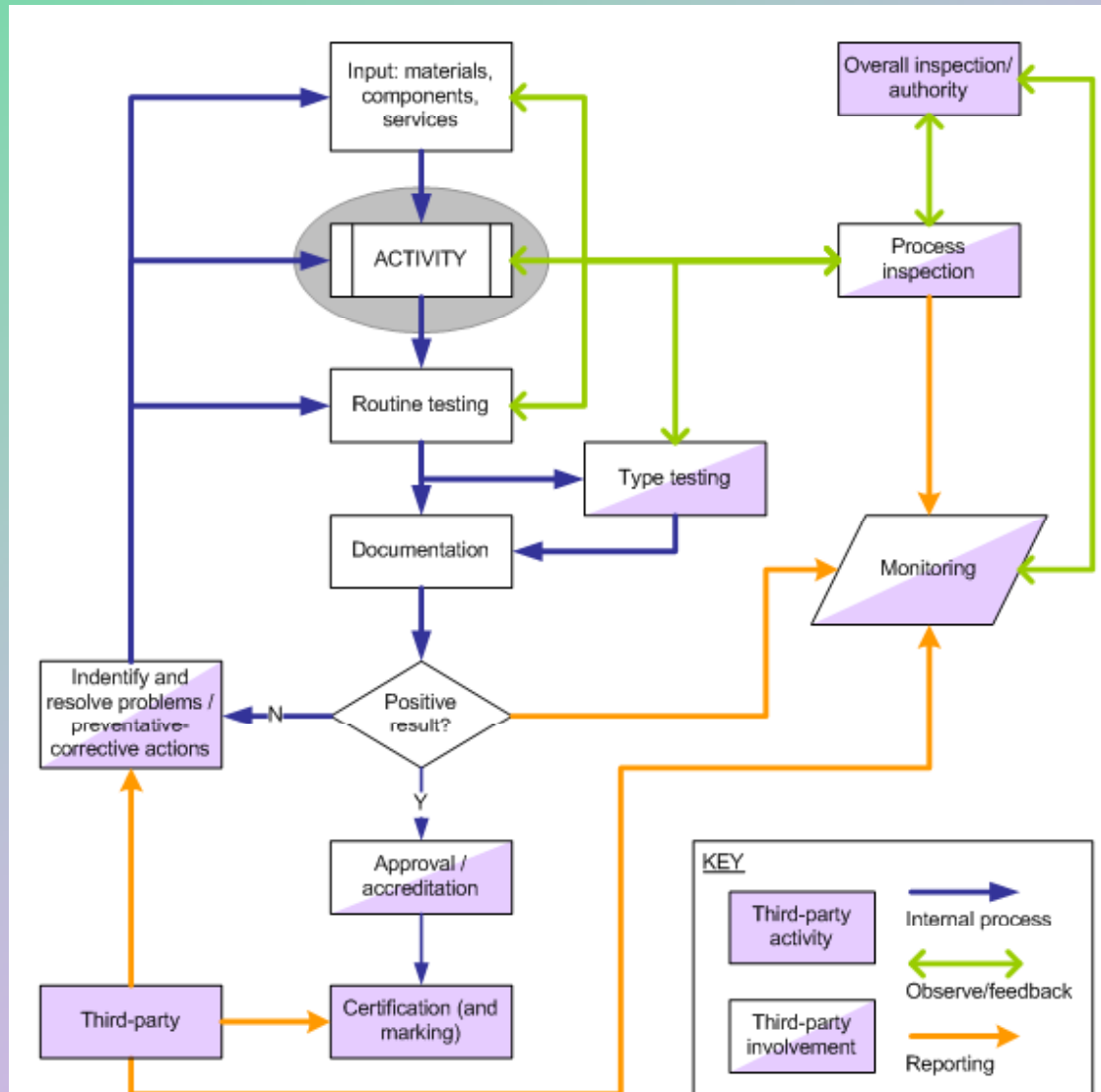
- Sections include:
 - Overview to the entire concept
 - Basic safety with flammable refrigerants
 - Development of safety management systems
 - Identification of cooperation partners
 - Framework of regulations and standards



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Part 2: Quality systems for safety

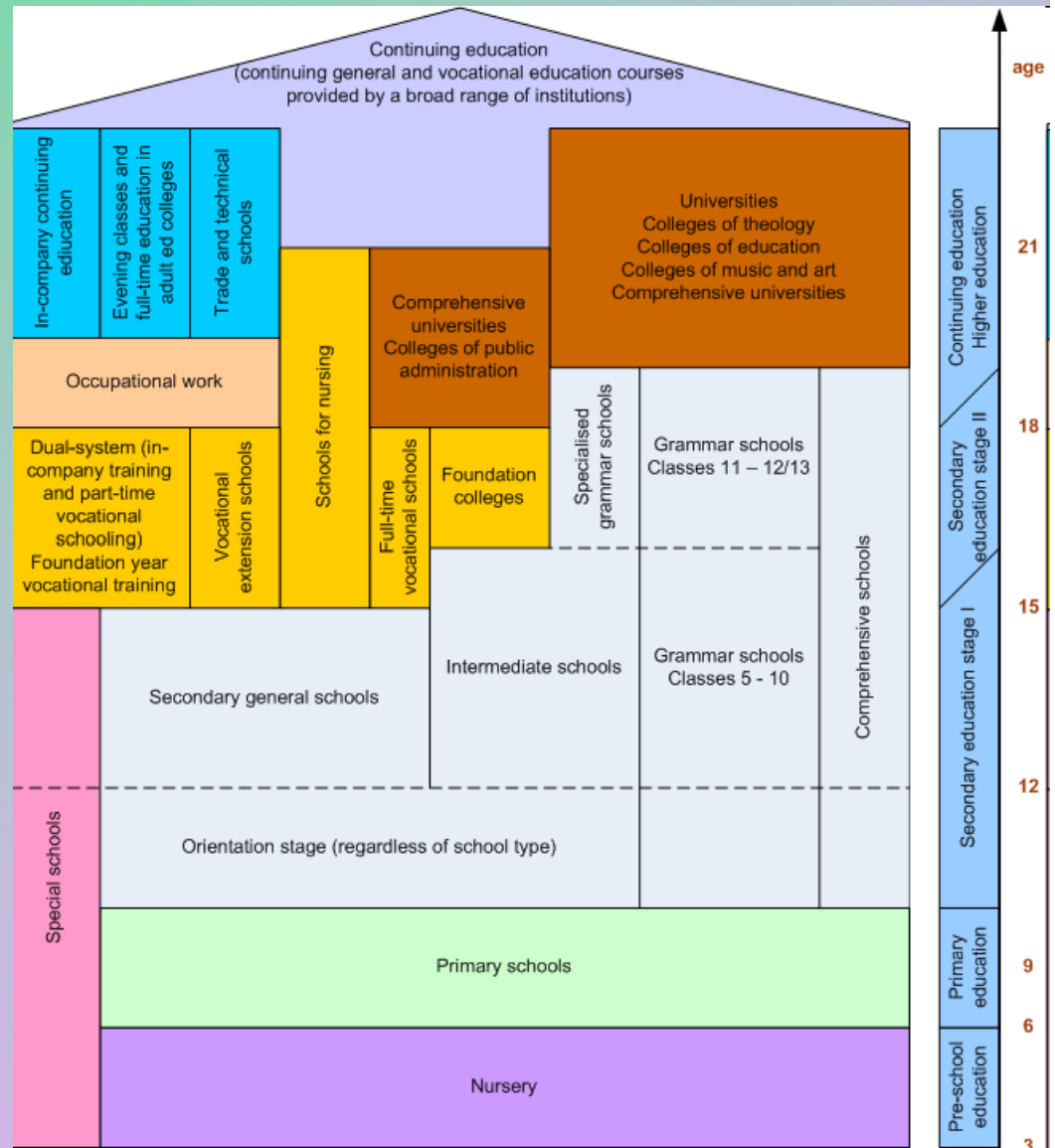
- Sections include:
 - Introduction
 - Feed-in elements (inputs)
 - Testing
 - Inspections
 - Monitoring
 - Feedback and preventative/corrective action
 - Accreditation and certification



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Part 3: Training

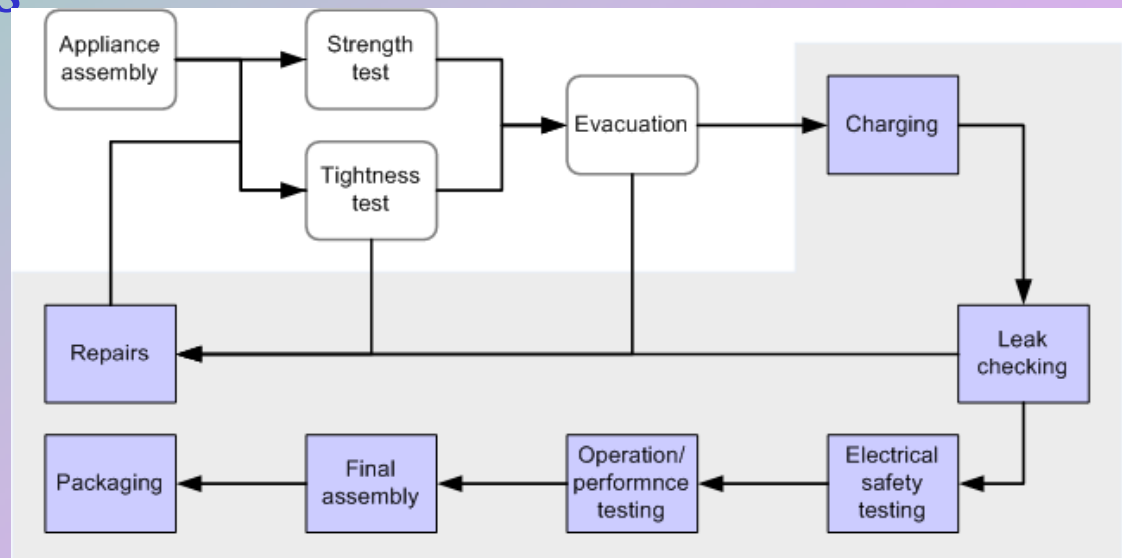
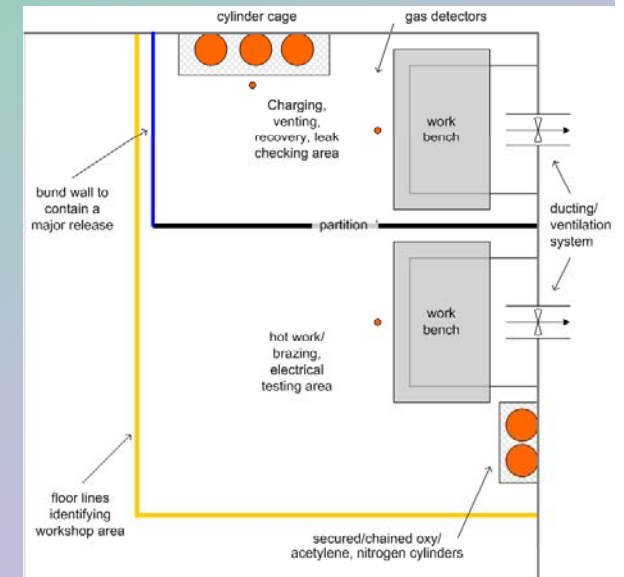
- Sections include
 - Introduction to training
 - Training facilities
 - Management system
 - Content for standard refrigeration training
 - Training for design and development
 - Training for production
- Supporting material provided within the Appendices



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Part 4: Production and manufacturing facilities

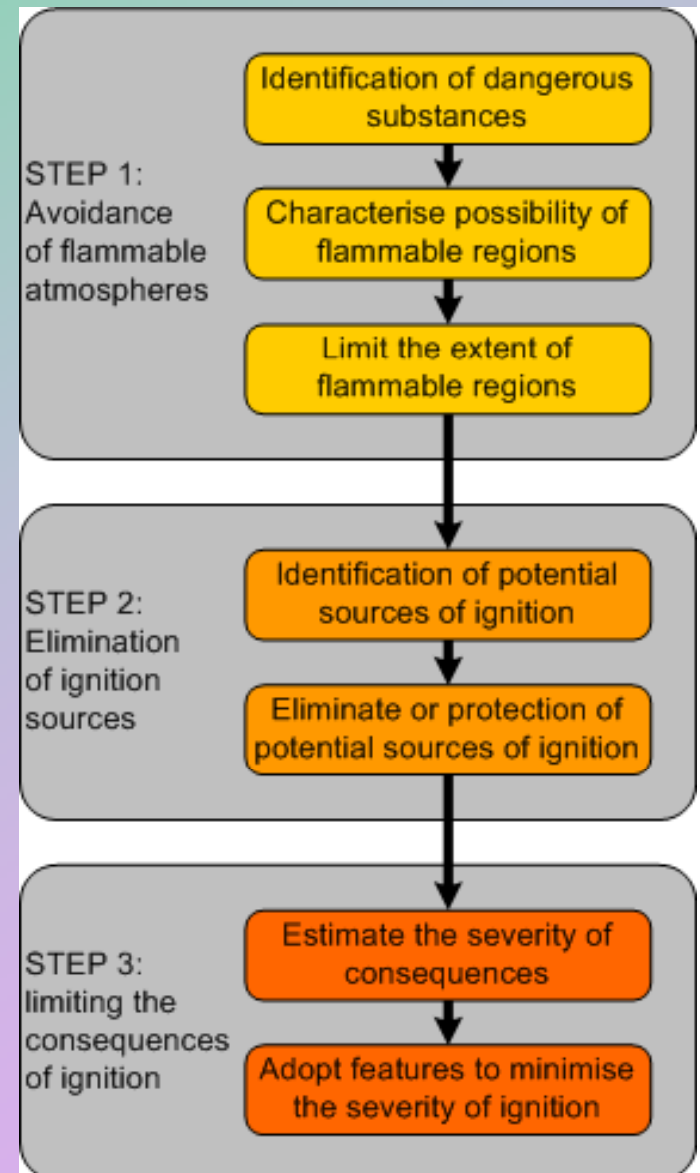
- Sections include:
 - Introduction
 - Refrigerant supply
 - Appliance production
 - Factory safety set-up
 - Workshop/repair areas
 - Carriage of systems
 - Storage of systems



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Part 5: Equipment design and development

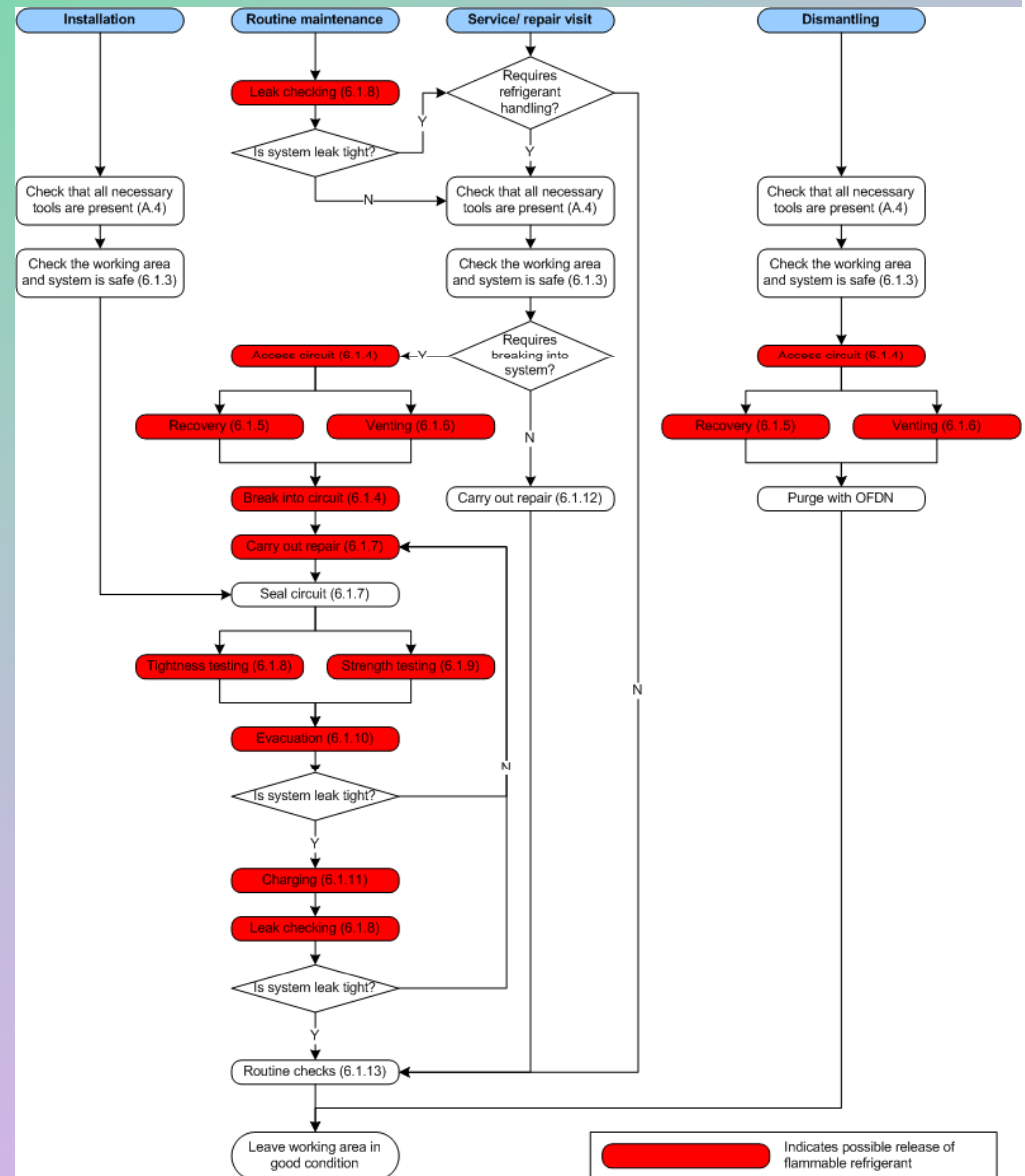
- Sections include:
 - Safe design for HC refrigerants
 - Avoidance of leakage
 - Refrigerant charge size limits
 - Charge size reduction
 - Sources of ignition/avoiding ignition
 - Design of system installation
 - Marking and instructions
 - Risk analysis



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Part 6: working on systems and equipment

- Sections include:
 - Technician activities and refrigerant handling
 - Installation of equipment
 - Commissioning of installations
 - On-site and workshop conversions
 - Dismantling



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"How to"

- Technicians, manufacturers, suppliers, consultants, end users, etc, can easily use safety issues as an "excuse" to not use HCs
 - This excuse must be removed
- The purpose of the handbook is to provide stakeholders with comprehensive information on using HC safely
 - Essential to demonstrate that all the information is "there"
 - Important to ingrain knowledge in technicians, enterprises, etc.
 - How to think more broadly, long term, integrate safety concept into all activities
 - Provide information is available in many languages (handbook will be translated into Chinese, Spanish(?), Russian(?), etc

Thank you for your interest...

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Electronic version from:
www.gtz.de/proklima

