



Electrical Safety Project

WP3 - Systems Compliance with Standards

L. SCIBILE for WP3

15-12-2023

EDMS#3010308

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WP3 – Scope, mandate and deliverables

MANDATE:

- Link with the equipment groups, ATS groups & projects to facilitate the application of appropriate standards within the ATS.
- Give support to the process defined by WP2.

SCOPE:

- **Accelerator equipment:**
 - Accelerators complex: injectors, LHC and transfer lines.
 - Experimental areas: EA, NA, ISOLDE/HIE- ISOLDE, CLEAR, NTOF, AD, HiRadMat.
 - ATS projects: HL-LHC, AWAKE, NA-CONS.
 - Machine buildings linked to the accelerators complex.
- **Equipment to be installed/consolidated in the future (being designed/manufactured).**

DELIVERABLES:

- D3.1 : Identify with equipment groups points to be checked per **equipment type** to be compliant with the standards (give support to CE “certification”).
- D3.2: Produce cross-checking lists to enable points to be put into conformity.
- D3.3: Ensure final document (to trace this) is produced.

What is electrical safety compliance?

Electrical safety **compliance** refers to the **adherence to established standards and regulations** that ensure the safe design, installation, operation, and maintenance of electrical systems and equipment. This **compliance** is crucial to **prevent electrical hazards** which can lead to injuries, fatalities, or property damage.

Key aspects of electrical safety compliance include:

- **Legal compliance:**

- The applicable CERN safety codes and linked EU directives.

- **Technical compliance:**

- **Design and Installation:** **Electrical systems and equipment** must be designed and installed according to the applicable standards and codes.
- **Testing and Certification:** Electrical products might require testing and certification by recognized testing laboratories to ensure they meet safety standards.

WP3 SCOPE

- **Operational compliance:**

- **Adherence to Safety Standards:** Ensuring that all operations are conducted in a manner that aligns with established safety standards and codes
- **Proper Use of Equipment:** Using electrical equipment as per the manufacturer's guidelines and industry standards.
- **Regular Inspections and Maintenance:** Electrical systems should be regularly inspected and maintained to ensure they remain in a safe, operational condition.
- **Emergency Procedures:** Establishing and following proper emergency procedures in the event of an electrical accident is part of safety compliance.
- **Training and Qualification of Personnel:** Ensuring that individuals operating or maintaining electrical systems are properly trained and qualified.
- **Documentation and Record Keeping:** Keeping accurate records of maintenance, inspections, upgrades, and any incidents or repairs.
- **Emergency Preparedness:** Having well-defined emergency procedures and training personnel to respond effectively in case of electrical accidents or malfunctions.

WORKPLACE SAFETY

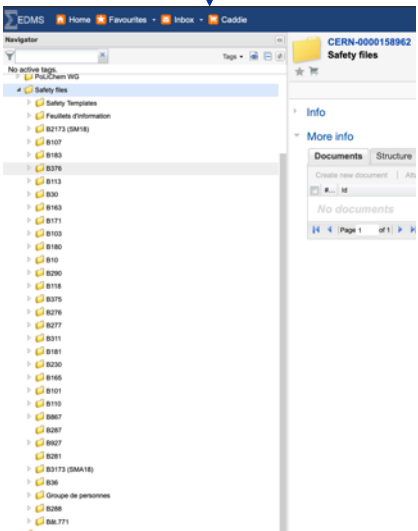
CERN

All Buildings

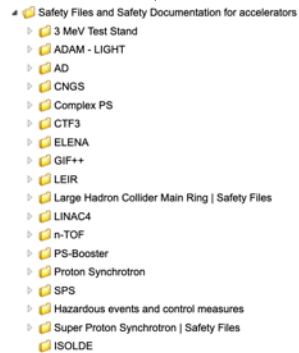
TE Buildings

(All - TE) Buildings

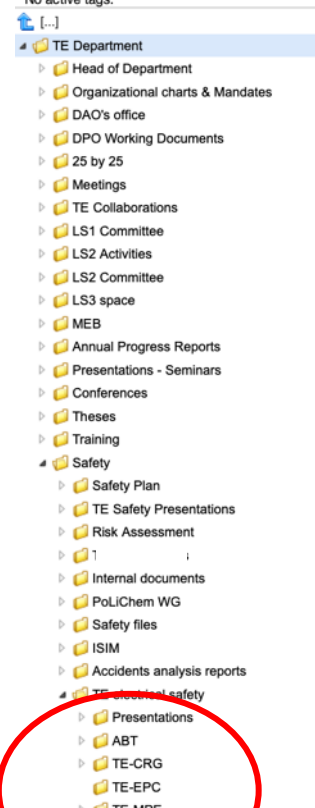
Accelerators



Safety operational procedures



Certifications and Standards Compliance (electrical safety, machinery, etc.)



Example

Each equipment group is responsible for the **lifecycle safety documents** of equipment under their responsibility that include the **operational/safety documents** for the safe operation of the equipment under their responsibility.

Groups

EQUIPMENT SAFETY



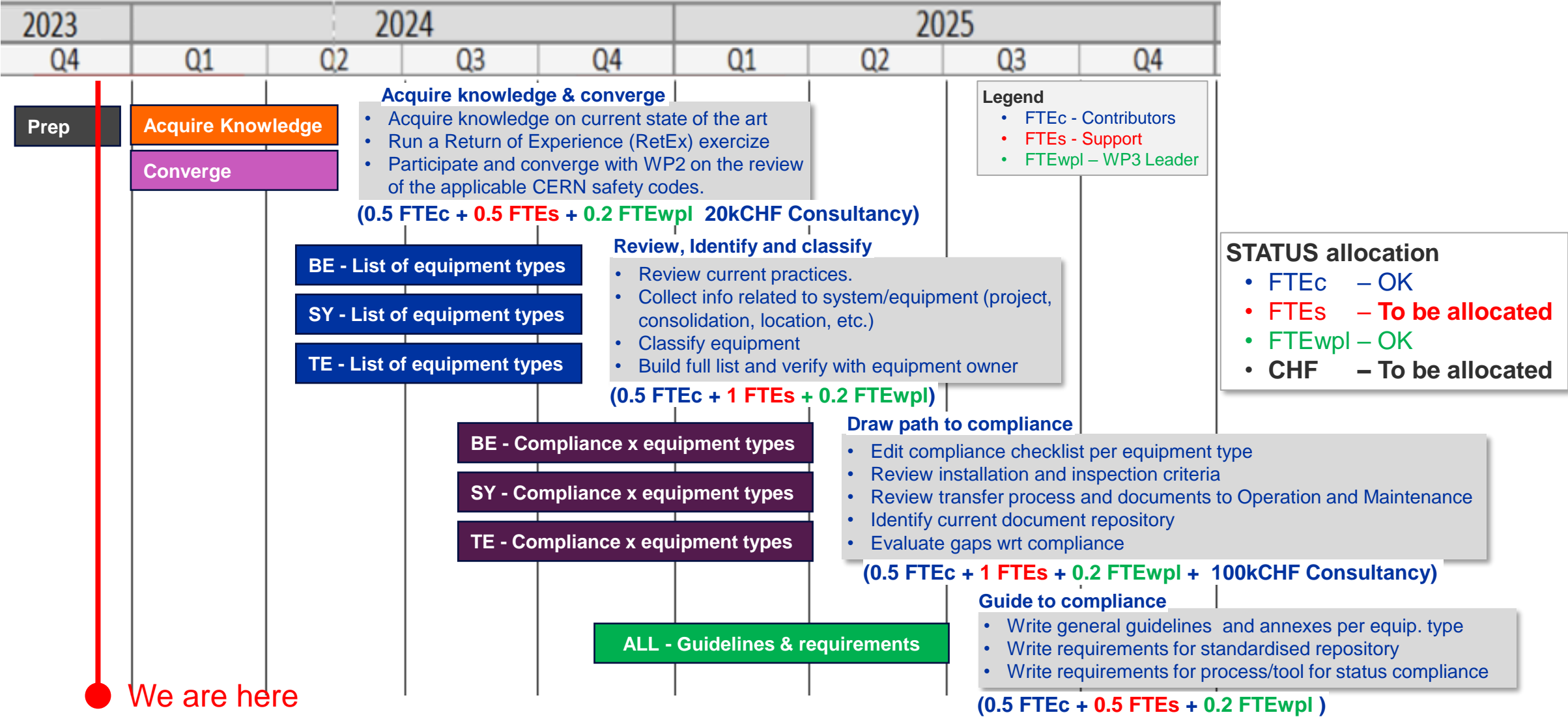
WP3 – Strategy

The aim of the WP3 is to provide the means to achieve Electrical Safety Compliance to all systems that will be installed in the accelerator complex.

This will be done by:

1. **Acquiring knowledge** on current state of the art in Electrical Safety Compliance and **running a Return of Experience (RetEx) exercise** on CERN compliance certification process.
2. **Reviewing** current practices in departments.
3. **Participate and converge** with WP2 on the review of the applicable CERN safety codes.
4. **Editing a guideline to compliance per equipment type** for all staff involved in the lifecycle activities leading to having a new electrical system in Operation. The guidelines will be based on the rules and certification provided by the WP2 and will include:
 - The basis of the legal compliance (the applicable CERN safety codes).
 - The basis of the technical compliance (the applicable standards).
5. **Providing requirements** for a **standardised repository** for the compliance documentation to WP6.
6. **Providing requirements** for a **system/tool** that allows to retrieve the “compliance” status to WP6.

WP3 – Work loaded schedule



● We are here

WP3 – Status of activities

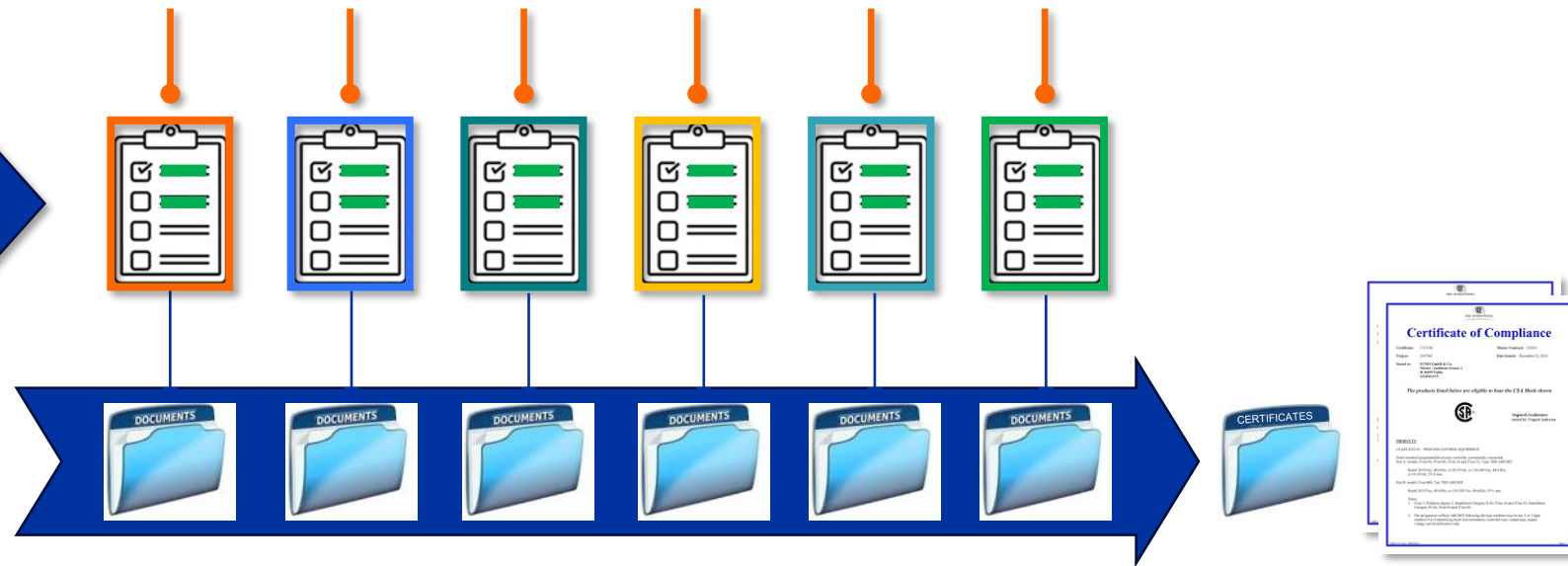
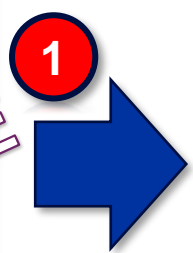
- WP3 Kick-off meeting held on the 2nd November 2023 and 2nd meeting on 6th December 2023.
- Several bilateral meetings with WP1 and WP2 to define common understandings on scope.
- Started discussion with contributors on strategy and deliverables.

WP3 Contributors	Dept. Group
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WP3 – System/equipment classification

1. **CE marked** equipment – catalogue products.
2. **CE marked** equipment – design and manufacturing by a contractor based on a CERN specification (built-to-spec approach).
3. **Non-CE marked** equipment (e.g. UL marking) – catalogue products.
4. **Non-CE marked** equipment designed by CERN and manufactured by CERN or assembled by industry.
5. **Non-CE marked** equipment and subsystems – design and manufacturing by a contractor based on a CERN specification (built-to-spec approach).
6. CERN equipment integrating **Non-CE marked** sub-systems and components integrated – design and manufacturing by a contractor based on a CERN specification (built-to-spec approach).

WP3 – (1) Guidelines



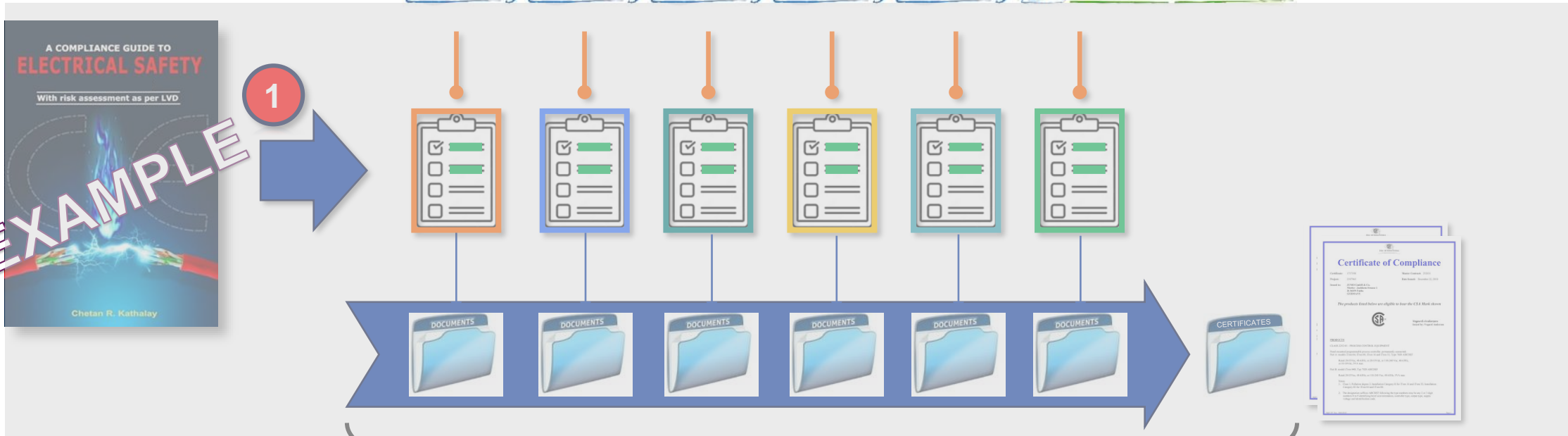
A guideline to compliance per equipment type for all staff involved in the lifecycle activities leading to having a new electrical system in Operation.

WP3 – The steps in the guideline.

WP3 SCOPE

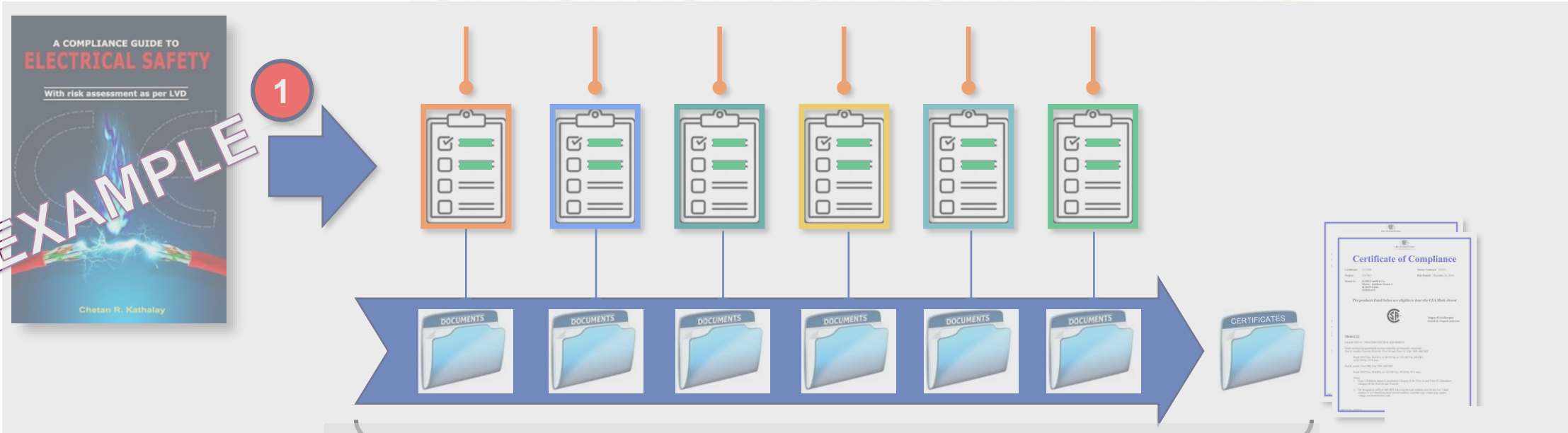
- **Identify** - Definition of electrical SYSTEM/EQUIPMENT.
- **Classify** - What are the cases and how to deal with them (CE marked or not).
- **Design** – Apply the appropriate technical standards wrt the system and its associated risk.
- **Comply** - Positive tick the checking lists required for the compliance.
- **Install** - Follow the installation and operation prescription of electrical equipment.
- **Inspect** - Initial electrical safety inspection to get the OK to connect to Energy Source.
- **Transfer** - hand over the system/equipment to the O&M team with the relevant documentation.
- **Operate** - Operate the equipment with the appropriate documented processes.
- **Maintain** – Compliance must be re-evaluated if major modifications are implemented.

WP3 – (2) Standardised repository

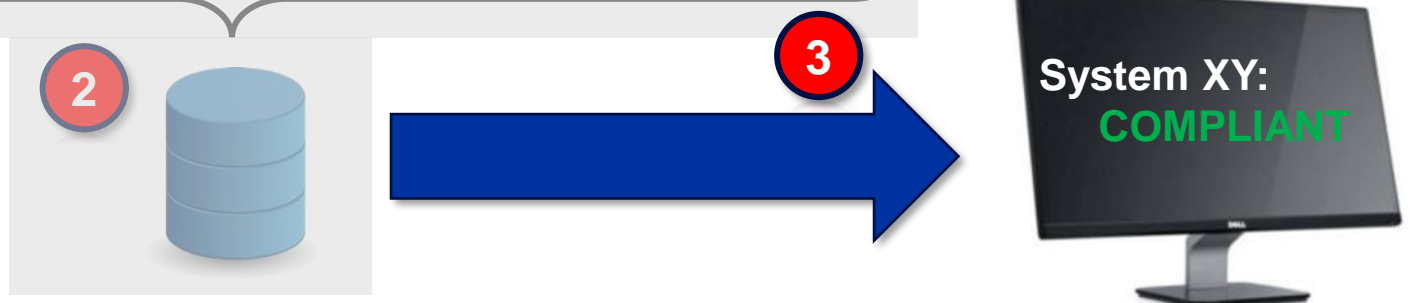


Provide requirements for a standardised repository for the compliance documentation.

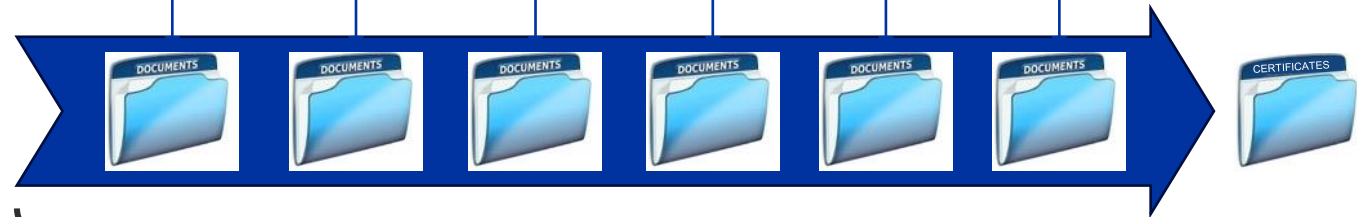
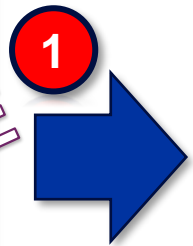
WP3 – (3) System/tool



Provide requirements for a system/tool that allows to retrieve the “compliance” status.



WP3 - Deliverables



Provide the means to achieve Electrical Safety Compliance to all systems that will be installed in the accelerator complex.



WP3 – Links with other WPs

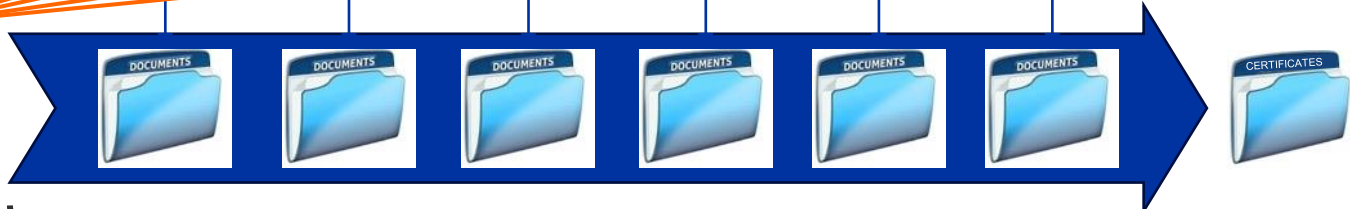


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WP2:
- Rules,
- Certification.



WP4:
- Electrical risks,
- Processes,
- Lock-out



WP6:
- Documentation,
- Data Bases & Electrical Safety Portal

2



3



Conclusions

- **WP3 has started its tasks and a way to system compliance is proposed.**
- **Strong links with the other WPs have been identified.**
- **A preliminary resource estimates indicates the need for**
 - 1 FTE for the WP3 support activities for ~ 1 year starting Q2 2024.
 - 120 kCHF for training and consultancy.
- **Next steps are:**
 - **Acquiring knowledge** on current state of the art in Electrical Safety Compliance
 - **Running a Return of Experience (RetEx) exercise** on CERN compliance certification process.
 - **Reviewing current practices** in departments.
 - **Participate and converge with WP2** on the review of the applicable CERN safety codes.

Spare slides

Electrical Compliance vs Electrical Conformity

- **Electrical compliance** is often used in a legal or regulatory context, ensuring that electrical installations or practices adhere to laws, safety regulations, standards, or guidelines related to electrical systems and equipment.
- **Electrical conformity** tends to be more about the technical specifications of products and systems, ensuring they perform as expected and safely integrate with other components or systems. Electrical conformity is more about meeting the technical specifications set by standardization bodies (like the IEC).
- Both terms deal with meeting certain standards or requirements.