

Standards and Assessment Guide

Electrical Installations

Introduction

Welcome to the Standards and Assessment Guide (SAG), a comprehensive resource designed to support excellence in assessment practices for all skills competitions hosted at the WorldSkills Competition. A key component of the SAG is the commitment to continuous improvement through ongoing review, ensuring that these guides consistently reflect the latest industry innovations and high standards of assessment in an open and transparent manner.

Purpose

The primary purpose of this guide is to provide a structured framework for the consistent and fair assessment of each skill competition. It aims to ensure that all assessments are conducted with a high degree of accuracy, reliability, and validity, and reflect global industry standards. By adhering to these guidelines, assessors can maintain the integrity of the competition and uphold the high standards associated with WorldSkills.

Note: this guide is not a replacement for the Marking Scheme and should only be used as a reference when required during the assessment process. Competitors are not allowed to have a copy of this SAG in the workshop in either digital or paper form.

Scope

This document covers general assessment practices applicable to a diverse range of industry sectors including:

- Manufacturing and Engineering Technology
- Information and Communication Technology
- Construction and Building Technology
- Transportation and Logistics
- Social and Personal Services
- Creative Arts and Fashion

Each skill competition has its unique requirements and benchmarks, which are detailed within sections of this guide. The consistency of assessment across each skill is the overarching principle, ensuring a unified approach to evaluating Competitor performance to the highest standards.

Key Components

The guide is structured into several key components, each addressing critical aspects of the assessment process:

1. Assessment Principles and Objectives

- Emphasis on fairness, transparency, and objectivity in assessments.
- Alignment with global industry standards and best practices.

2. Assessment Methods and Tools

- Description of various assessment methods in Measurement and Judgement
- Guidance on the application of appropriate assessment tools and equipment (if applicable).

3. Criteria and Benchmarks

- Examples of assessment criteria and aspects for each skill, outlining the expected competencies and performance standards.
- Benchmarks for different levels of proficiency i.e. Judgement award range 0, 1, 2, 3 or Yes / No criteria alongside clear measurable descriptors.

4. Expert assessment requirements

- Completion of the Access Programme
- Approved Curriculum Vitae (CV)
- Reaching 100% Expert preparedness
- Full participation of online and in-person Mandatory Assessment Training (MAT)
- Completion of practical assessment testing at the Competition

5. Quality Assurance and Improvement

- Mechanisms for monitoring and evaluating the assessment process.
- Strategies for continuous improvement and feedback incorporation.
- Ongoing periodic review of the assessment process

Implementation

For effective implementation, this guide should be used for guidance purposes only and in parallel with the Technical Description for each skill. Experts are encouraged to familiarize themselves thoroughly with both the general guidelines and the particular requirements of their respective skill areas. Collaborative efforts between the Skill Management Team, Experts, and Competitors are vital for achieving the ultimate goal of global skills development.

Conclusion

The Standards and Assessment Guide embodies the commitment of the WorldSkills movement to nurturing talent and promoting the highest standards of vocational education and training worldwide. By providing clear and comprehensive guidance, we aim to empower Experts to conduct marking and assessment practices that are not only rigorous and equitable but also inspiring and transformative for all participants.

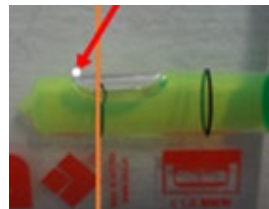
Thank you for your dedication to upholding these standards and contributing to the success of the WorldSkills Competition. Together, we can continue to champion skills excellence and celebrate the achievements of talented individuals from around the globe.

Skill 18 – Electrical Installations

Measurement

Measurement is used to assess accuracy, precision, and other performance that can be measured objectively. It is used where ambiguity must be avoided.

The total marks allocated to measurement marking may vary from competition to competition depending on the Test Project.

5	Level Measurements	Yes	No
	Yes or No		

5	Multifunction actuator Channel 3 Operates Light H6	Use a screwdriver to flip the switch from 0 to 1 on channel 3/C. If the device has buttons, you can turn the channel on/off with this. Verify that light H6 Turns ON when 1 and off when 0.	

Judgment

Judgment is used to assess the quality of performance. There may be small differences of view when applying the external benchmarks.

The Resources column in the table below may include all kinds/formats of resources such as a link to a YouTube video, a website link, an illustration, a photo, a reference to a book, and so on. It needs to be as detailed as possible to show the differentiation between 0, 1, 2, 3.

Generic rules:

The assessment group comprises three Experts plus one Expert who acts as supervisor. The supervising Expert will replace an Expert in the marking group to prevent compatriot marking.

The difference of the three Experts' scores may not exceed 1. If this is the situation the Experts must re-score until there is a maximum difference of 1. As long as the three Experts judge within 1, the result can be entered into the CIS.

The total marks allocated to judgment marking may vary from competition to competition depending on the Test Project.

Skill 18 MAT Practical Judgement

Part 1 (for all experts)

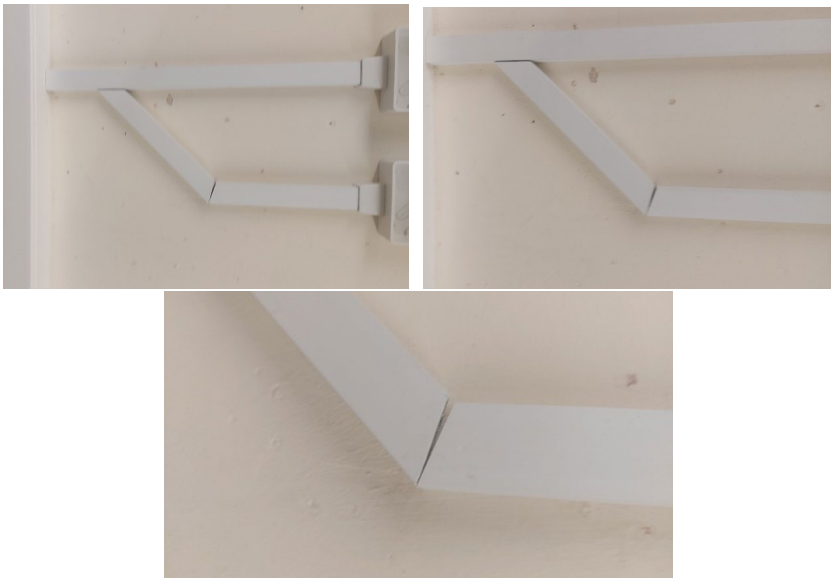
Pictures of different installation ways will be shown to the experts together with the judgment explanations of what the 0-3 scores mean.

For example, with the **installation of trunking**:

- Below industry standard or no attempt: Joints are badly cut with excessive gaps. Lids not fitted or not fitted correctly. Roll or movement of trunking.
- Meets industry standard: Joints are neat and even but with gaps. Covers fitted. No roll or movement.
- Industry standard with elements of good practice: Joints are neat with only some minor gaps. Covers fitted. No roll or movement.
- Excellent in comparison to industry standard: Joints are neat with no gaps. Covers fitted. No roll or movement.

Aspect – D2 - Installation of Wireways PVC Trunking

PVC Trunking. Securely fitted. The joints and angles are neat. Secure with no roll. Does not include any natural flexing of PVC Trunking.

WSOS section as per TD	Score	Descriptor	Resource
5	0	Below industry standard or no attempt: Joints are badly cut with excessive gaps. Lids not fitted or not fitted correctly. There is a roll or movement of trunking.	
	1	Meets industry standard: Joints are neat but with some gaps. Covers fitted. There is no roll or movement.	

WSOS section as per TD	Score	Descriptor	Resource
	2	Generally above Industry standard with elements of good practice: Joints are neat and even (parallel) with only some minor gaps. Covers fitted. There is no roll or movement.	

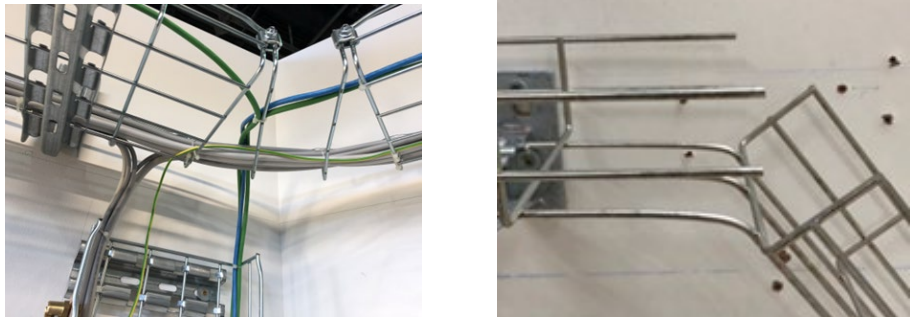
WSOS section as per TD	Score	Descriptor	Resource
	3	Exceeds industry standard: Joints are neat with no gaps. Covers fitted. There is no roll or movement.	

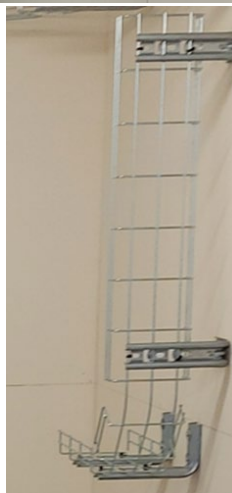
Aspect - D2 Installation of Wireways Mesh Tray

Mesh Tray.

Securely fitted. Bends are equally shaped. Secure with no roll or movement. Does not include any natural flexing of the mesh tray. **NOTE:** More sections removed on the mesh tray than required for fabrication/joint are used to assess excessive gaps.

WSOS section as per TD	Score	Descriptor	Resource
5	0	Below industry standard or no attempt: Fabrications / Joints are badly cut with excessive gaps, (all joints). Bends/sets are badly distorted. Cuttings have sharp edges. There is a roll or movement of the mesh tray or brackets.	 

WSOS section as per TD	Score	Descriptor	Resource
	1	Meets basic industry standard: Fabrications / Joints are neat, but with gaps, (majority of joints are good). Some distortion on bends/sets. Some cuttings have burrs. No roll or movement of mesh tray or brackets	
	2	Meets industry standards with elements of good practice: Joints are neat with no gaps. There are some minor distortions on bends/sets. No cuttings have burrs. There is no roll or movement of the mesh tray or brackets.	

WSOS section as per TD	Score	Descriptor	Resource
	3	Exceeds industry standard: All joints are neat with no gaps. Bends/sets have no distortion. Cuttings have no burrs. No roll or movement of mesh tray or brackets	  

Aspect – D2 Installation of Wireways, Metal Tray

Metal Tray. Securely fitted. The joints and angles are neat with no gaps. Secure with no roll. Does not include any natural flexing of the Metal Tray.

WSOS section as per TD	Score	Descriptor	Resource
5	0	Below industry standard or no attempt: Joints are badly cut with excessive gaps. Cuts have sharp edges. There is roll or movement of metal tray or brackets.	

WSOS section as per TD	Score	Descriptor	Resource
	1	Meets minimal industry standard: Joints are neat and even but with some gaps. Cuts have some burrs. There is no roll or movement of the metal tray or brackets	

WSOS section as per TD	Score	Descriptor	Resource
	2	Above minimal Industry standard with elements of good practice: Joints are neat and even, with only some minor gaps. Cuts have no burrs. There is no roll or movement of the metal tray or bracket.	

WSOS section as per TD	Score	Descriptor	Resource
	3	Exceeds industry standard: Joints are neat and even, with no gaps. Cuts have no burrs. There is no roll or movement of the metal tray or bracket	  

Aspect – D-3 - Installation of Wireways, Metal Conduit

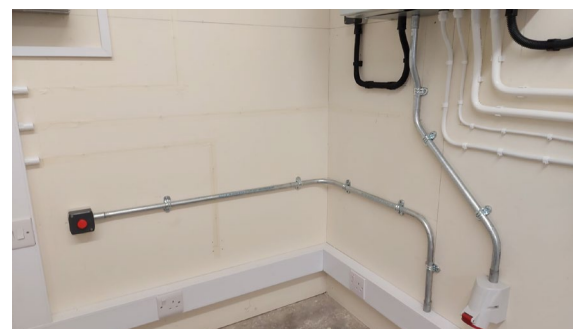
Metal Conduit. Sets, Jump overs, bends: even straight with no distortions.

WSOS section as per TD	Score	Descriptor	Resource
5	0	Below industry standard or no attempt: Saddles not suitable or poorly fitted, poor or no termination to trunking or boxes, fabricated work such as; sets, jump, bends, majority are not straight (not matching if applicable) or badly distorted	

	1	Meets industry standard: Saddles suitable fitted and spaced and correct terminations to trunking and boxes. Fabricated work such as; sets, jump overs, bends, majority straight (not matching if applicable) with some minor distortion.	
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2

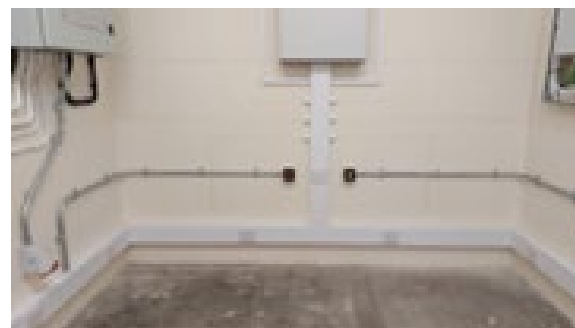
Industry standard with elements of good practice:
Saddles correctly fitted and majority evenly spaced and correct terminations to trunking and boxes.
Fabricated work such as sets, jump overs, and bends all straight (closely matching if applicable) with no distortion.



3

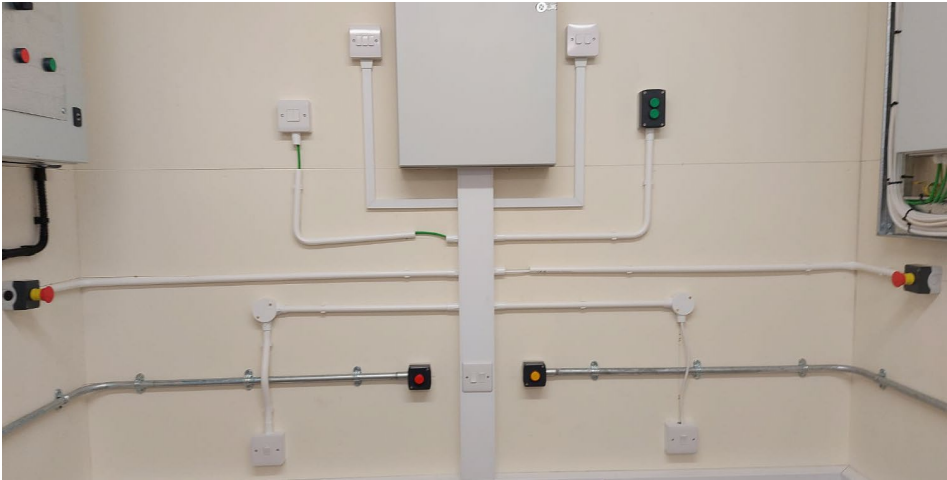
Excellent in comparison to industry standard:
Saddles correctly fitted all evenly spaced and correct terminations to trunking and boxes.
Fabricated work such as sets, jump overs, and bends all straight (matching if applicable) with no distortion

See further resource pic overleaf



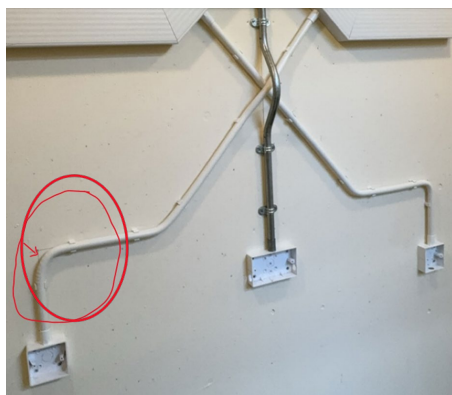
Aspect – D-3 – Installation of Wireways, PVC Conduit

PVC Conduit. Sets, Jump overs, bends: even straight with no distortions.

WSOS section as per TD	Score	Descriptor	Resource
	0	Below industry standard or no attempt: Saddles not suitable or poorly fitted, poor termination to trunking or boxes, fabricated work such as; sets, jump, bends, have unsuitable radius. The majority are not straight (not matching if applicable) or badly distorted	

1

Meets industry standard: Saddles suitable fitted and spaced and correct terminations to trunking and boxes. Fabricated work such as sets, jump-overs, and bends, have a suitable radius. The majority are straight (not matching if applicable) some distortion



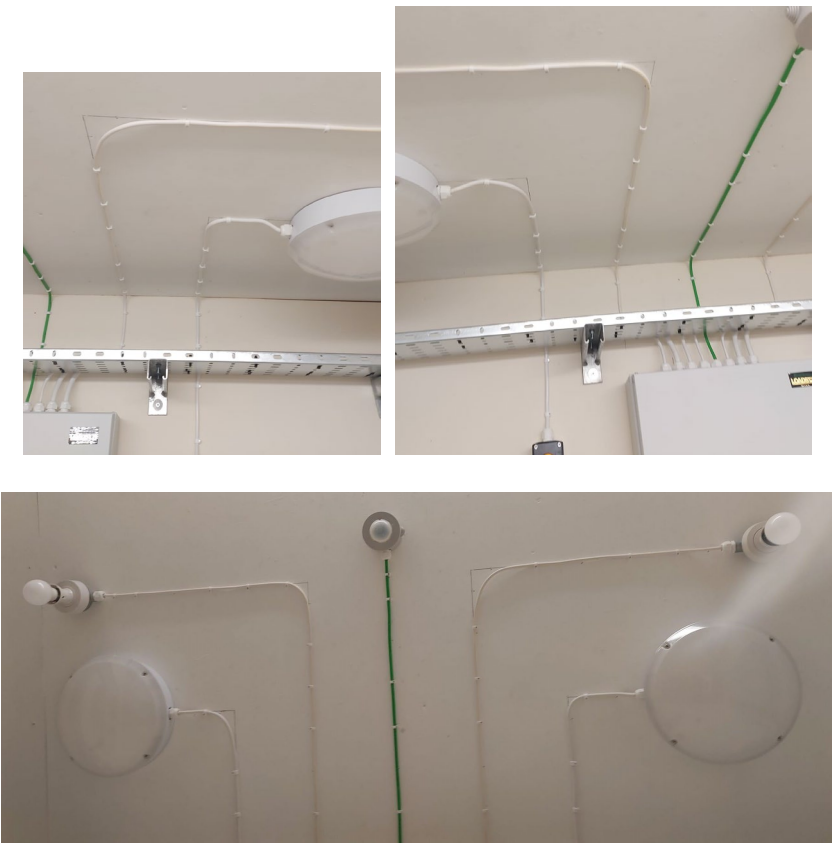
WSOS section as per TD	Score	Descriptor	Resource
	2	Industry standard with elements of good practice: Saddles correctly fitted and majority evenly spaced and correct terminations to trunking and boxes. Fabricated work such as; sets, jump overs, and bends, have suitable and even radii. All straight (closely matching if applicable) no distortion	 

WSOS section as per TD	Score	Descriptor	Resource
	3	Excellent in comparison to industry standard: Saddles correctly fitted all evenly spaced and correct terminations to trunking and boxes. Fabricated work such as sets, jump-overs, and bends, have an identical radius. All straight (matching if applicable) no distortion.	 

Aspect – D3 Installation of Wireways, Cable Clipping

Cable Clipping. Correctly clipped with straight runs and even bends.

WSOS section as per TD	Score	Descriptor	Resource
	0	Below industry standard or no attempt: The majority of clips are unevenly spaced. The cable is not straight and even. Bends too sharp or too long.	

WSOS section as per TD	Score	Descriptor	Resource
	1	Meets industry standard. The cable is straight and even with good bends but some clips not evenly spaced.	

WSOS section as per TD	Score	Descriptor	Resource
	2	Industry-standard with elements of good practice: Cable straight and even with good bends / even radius, the majority of cable clips are evenly spaced.	

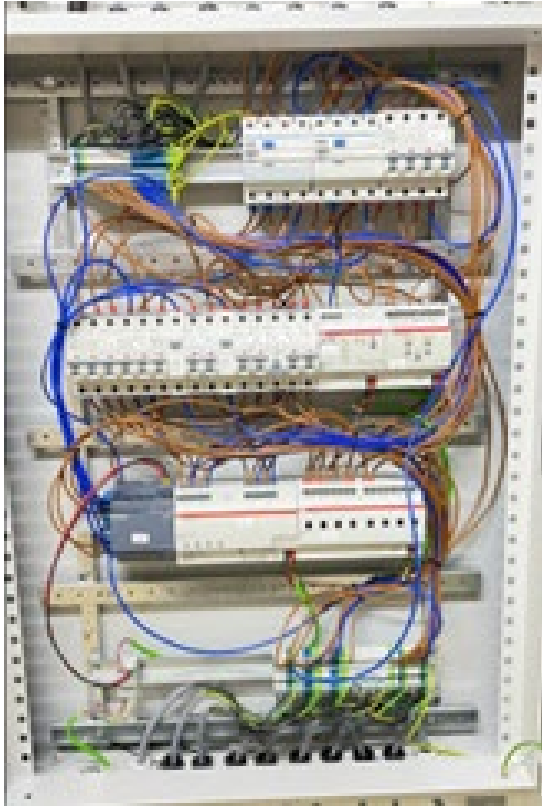
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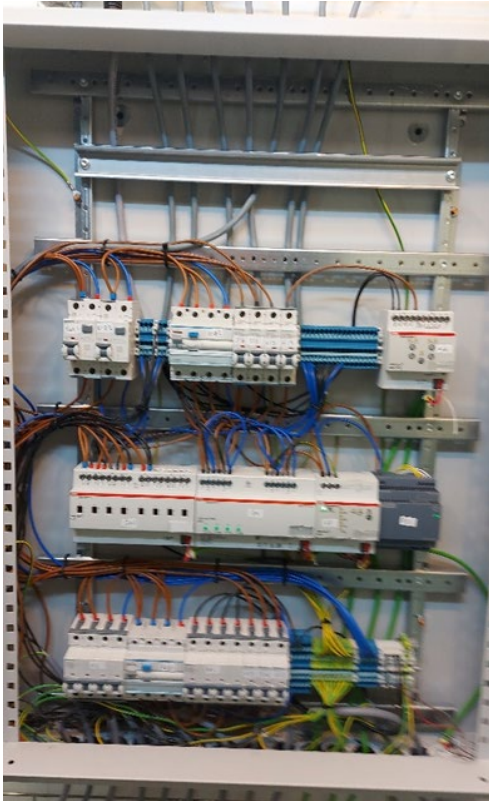
Excellent in comparison to industry standard: Cable straight and even with good bends / even radius and all cable clips evenly spaced.

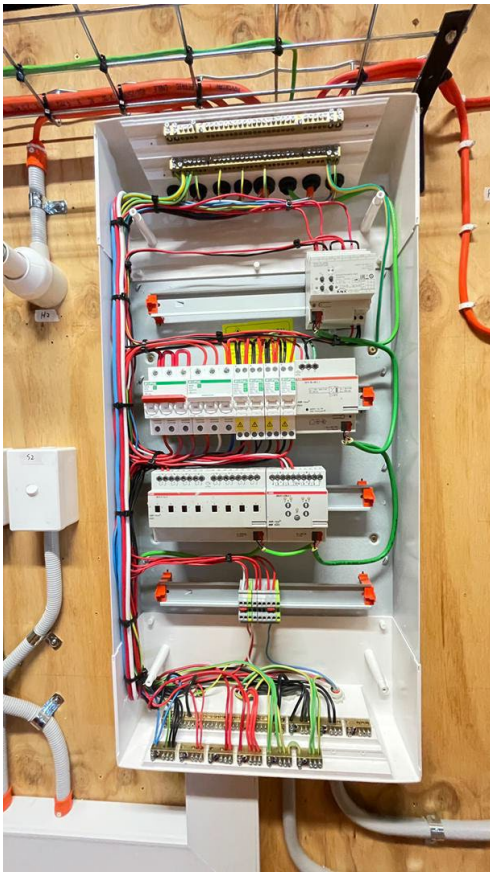


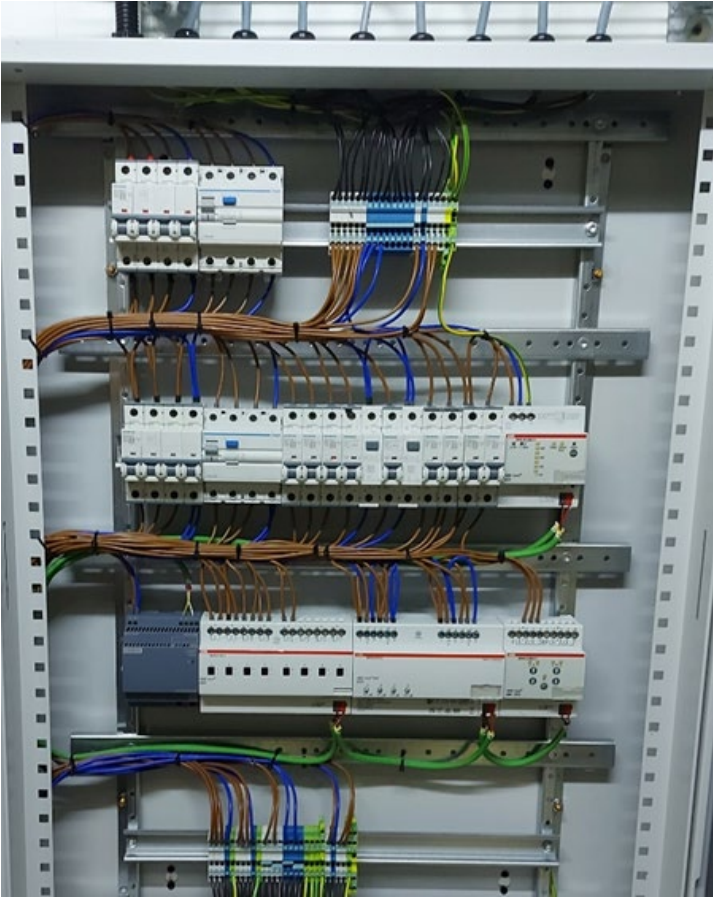
Aspect – E1 – Wiring on Boards, KNX board

Neatness of wiring NOTE: Straight and vertical refers to coming out of a suitable slot in the slotted trunking, or suitable place in the cable loom

WSOS section as per TD	Score	Descriptor	Resource
E1	0	Below industry standard or no attempt: Cables not loomed or loomed but untidy. Cabling with lots of crossover. The majority of cabling is not straight and vertical into switchgear.	

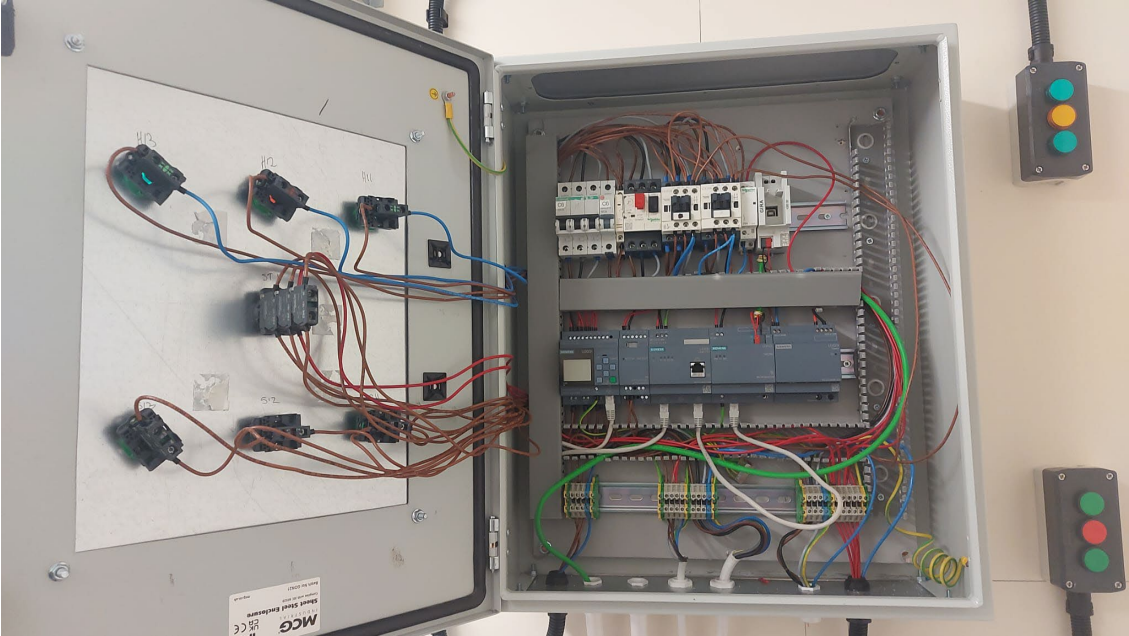
WSOS section as per TD	Score	Descriptor	Resource
	1	Meets industry standard: All looms are neat and tidy but with some cabling crossover. Some cabling is straight and vertical into switchgear.	

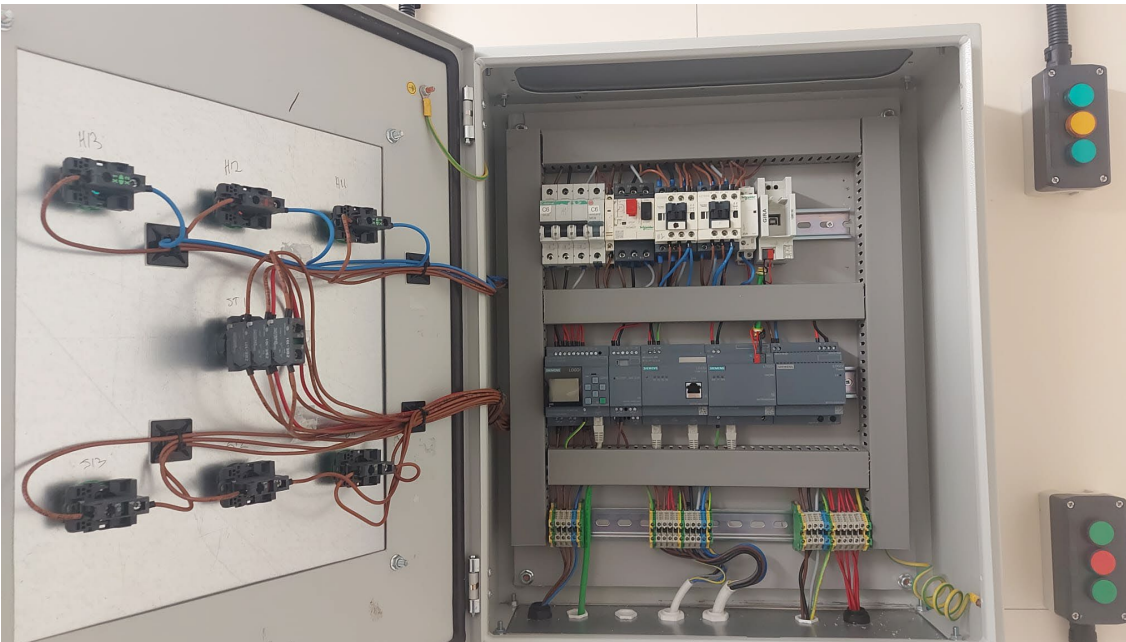
WSOS section as per TD	Score	Descriptor	Resource
	2	Industry standard with elements of good practice: All looms are neat with very few cabling crossovers. The majority of cabling is straight and vertical into switchgear.	

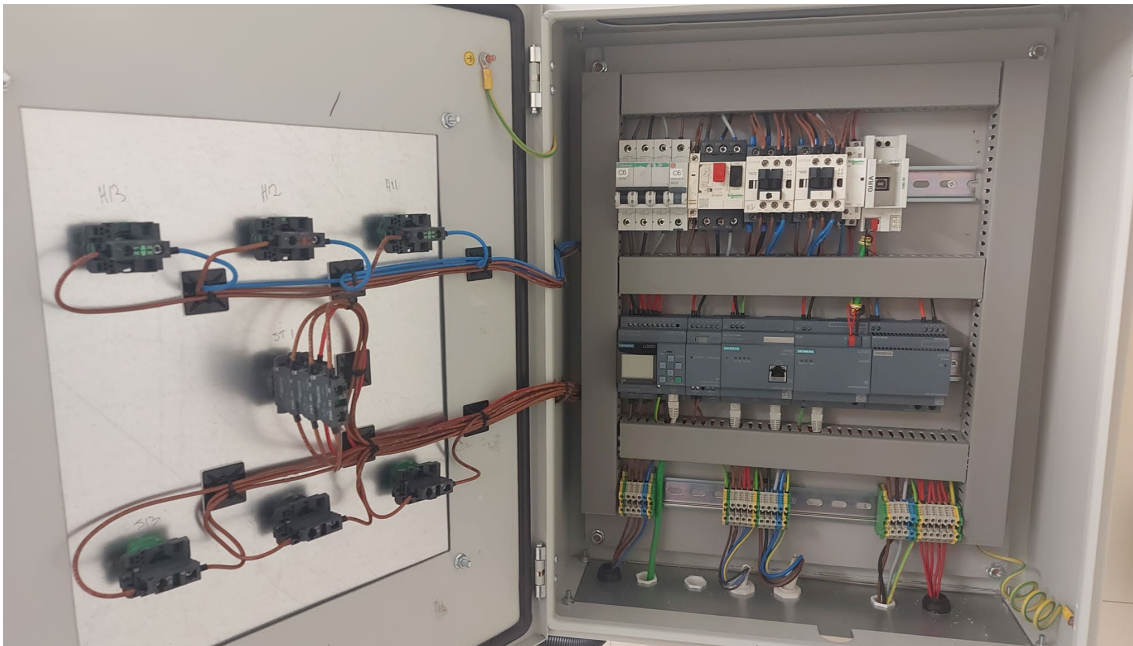
WSOS section as per TD	Score	Descriptor	Resource
	3	Excellent in comparison to industry standards: All looms with no cabling crossovers. All cabling is straight and vertically into the switchgear.	

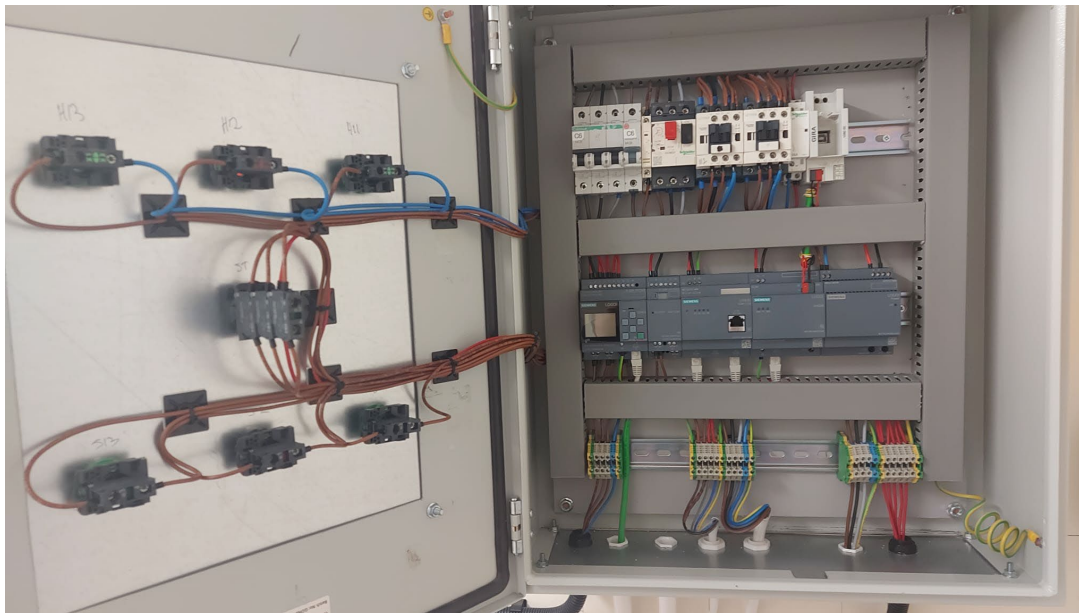
Aspect – Wiring on boards, control cabinet

Neatness of wiring NOTE: Straight and vertical refers to coming out of a suitable slot in the slotted trunking or a suitable place in the cable loom.

WSOS section as per TD	Score	Descriptor	Resource
	0	All cables not loomed or loomed but untidy.	

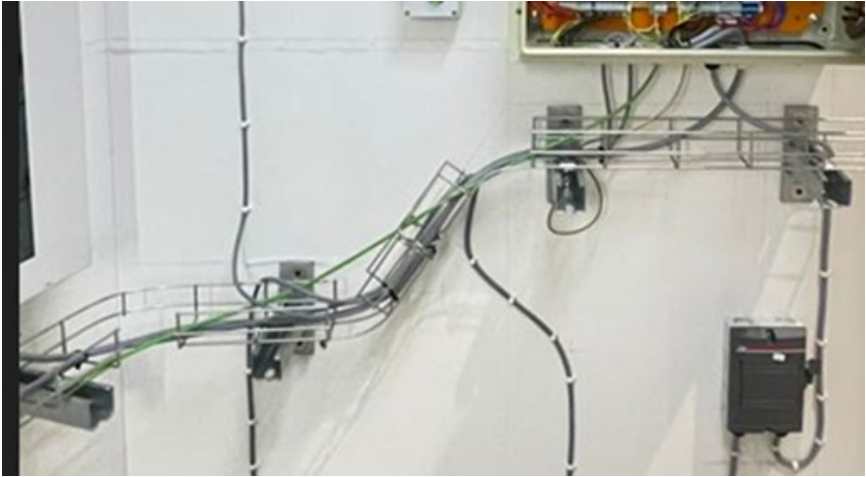
WSOS section as per TD	Score	Descriptor	Resource
	1	The cabling is not straight and vertical into the switchgear.	

WSOS section as per TD	Score	Descriptor	Resource
	2	The cabling is not straight and vertical into the switchgear.	

WSOS section as per TD	Score	Descriptor	Resource
	3	All looms with no cabling crossovers. All cabling is straight and vertical into the switchgear.	

Aspect – E-2 - Cabling on Tray or Mesh Tray

Neatness of cables on Tray. Note segregation of Data cable

WSOS section as per TD	Score	Descriptor	Resource
	0	Below industry standard or no attempt: All cables not cable tied or, cables not secured properly to the tray. The cable bending radius is too tight. The cabling has kinks. The cabling is twisted together throughout runs. No attempt to segregate data cable from mains during the run.	

WSOS section as per TD	Score	Descriptor	Resource
	1	Meets industry standard: Cables are neat tidy and secure, but cable ties are unevenly spaced. No kinks but a few twists. The data cable has been segregated as much as possible. The cable bending radius is suitable, the majority of the bends on cables are even	

WSOS section as per TD	Score	Descriptor	Resource
	2	Industry standard with elements of good practice: Cables neat and tidy and cable ties are evenly spaced. No kinks or twists on cables. The data cable has been segregated as much as possible. The cable bending radius is suitable, the bends on cables are even and follow a pattern.	

3

Excellent in comparison to industry standards. Cables are well grouped and stacked, very neat and tidy, and cable ties are evenly spaced. No kinks or twists on cables. The data cable has been segregated as much as possible. The cable bending radius is suitable, all the bends on cables follow a formed equal pattern.

