STIPEL

Assessment requirements for the certification of electrotechnicians

Working safely on electrical installations under the scope of the Dutch standards NEN 3140 and NEN 3840

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Tasks

The work of an electrotechnician in this sector may include the following activities:

1. assembly, which includes securing and activating installations, the activation on test voltage as part of checking the quality of the work that has been carried out, the first-time application of operating voltage and verification of functionalities including safety functions, all as project-based work

2. control and maintenance, which includes securing and activating installations, performing inspections and additional assembly work

3. operation, which includes operating distribution systems

4. fault clearing, which includes using visuals and measurements to map out incidents, opening panels to diagnose, securing installations, making minor repairs, installing overrides and activating the installation

5. measuring, which includes prepared and scheduled openings of panels, installation of measurement equipment, taking measurements and disconnection the equipment used for measurements

Roles and competences

In this document there is a difference between the management task and executive tasks of the electrotechnician.

1. The role of the electrotechnician that carries out executive tasks is referred to as a skilled person with an abbreviation of VP in this document. The role of the electrotechnician that carries out management tasks is referred to as a combined role of nominated person in control of a work activity and a nominated person in control of an electrical installation which has an abbreviation of IVWV in this document.
2. The role of a nominated person in control of an electrical installation (IV) is not specified separately from the nominated person in control of a work activity (WV).

Note 1 of this paragraph: The definitions of a nominated person in control of an electrical installation, nominated person in control of a work activity and skilled person are in accordance with the terms of NEN 3140 and NEN 3840.

Note 2 of this paragraph: These roles will be combined in the examination, even though the roles of nominated persons in control of a work activity and a nominated person in control of an electrical installation are different in NEN 3140 and NEN 3840. The regulations for safe working are mainly in Article 3.5 of the Occupational Health and Safety Decree. The WV must master these regulations and the IV must have knowledge of them at the same level. This issue is therefore tested for both IV and WV. The responsibilities of the IV are also governed by the regulations of Article 3.4 of the Occupational Health and Safety Decree and these regulations contain many aspects from NEN 1010 (such as paragraph 1) and this knowledge is not tested in the Stipel exam. The Stipel exam is therefore required for the IV, but the exam does not cover all their responsibilities.

Hazards (1)

The hazards that may occur in the tasks of the electrotechnician in this sector are:

1. **assembly:** touching or approaching live parts of test voltage, switching on short circuits, unknown defects of the installation or components, faulty security or interlocking
2. **control and maintenance:** touching or approaching live parts, which may include arc flash or flashover
3. **operation:** switching errors
4. **fault clearing:** all electrical hazards listed due to the unforeseen nature of the work
5. **measuring:** touching or approaching live parts, which may also involve arc flash or flashover

Hazards (2)

The table below provides an overview of the primary hazards as described in the RIVM's StoryBuilder.

HAZARDS ASSOCIATED WITH THE TASKS OF AN ELECTRICAL TECHNICIAN	
Contact or approach	
1.	Contact with or approach to live parts, which may result in the following effects: • Electric schock • Arc flash • flashover
Properties of components	
2.	Uninterruptible Power Supply (UPS)
3.	Residual charge (capacitors, cables, etc.)
4.	High voltage in end-use equipment (e.g., navigation systems, air handling units)
Reliability of components	
5.	Failure of protection or interlocking
Competence of the electrical technician	
6.	Failure to verify absence of voltage
7.	Making switching errors
8.	Incorrect protection and interlocking against unintended energization
9.	Failure to maintain adequate distance from energized components
10.	Incorrect selection of components and materials during assembly and repair
11.	Incorrect use of personal protective equipment and measuring and testing instruments
12.	Insufficient identification of technical defects in the installation or components

Hazards (3)

The RIVM Factsheet – **Contact with Electricity** (September 2012) provides an inventory of the causes of occupational accidents involving electricity over a study period from 1998 to 2009. Based on this data, a classification can be made into the five main categories of hazards along with their relative frequency in accidents.

Categories of hazards	Frequency in accidents
Working live / Not working on de-energized equipment/Insufficient protection against unintended energization/Failure to verify absence of voltage	**42-65%**
Failure to maintain adequate distance from energized components	**25-35%**
Improper use of personal protective equipment	**10-22%**
Failing installation or components/Insufficient or damaged insulation	**5-10%**
Failure of grounding or circuit interruption/Failure of protection against unintended energization	**2-12%**

Working areas

This document divides the installations where the electrotechnician works in the sector into four working areas, considering the risks and hazards associated with the complexity of the installation and the existing current and voltage.

The working areas are shown in the table below:

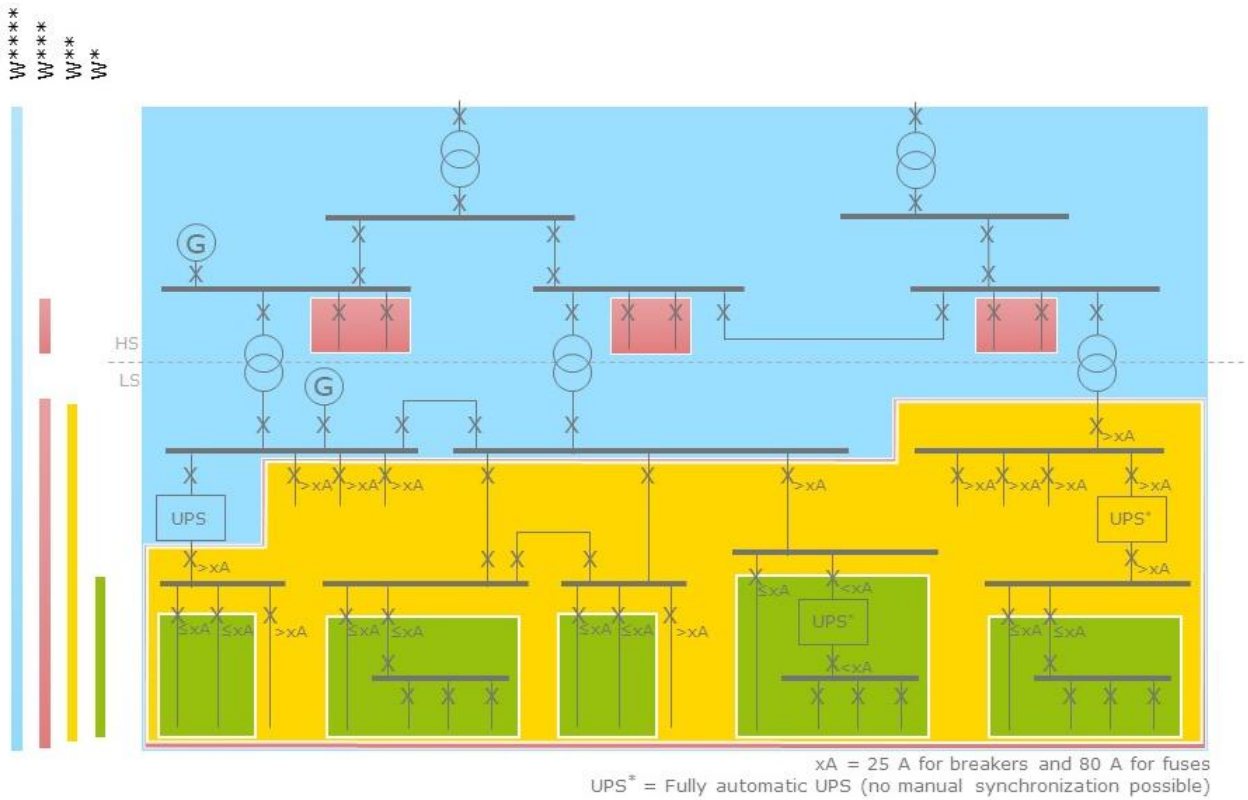
Working areas	Indication	Description of work
W*	**LV installations with limited current and voltage**	work on low-voltage installations behind circuit breakers up to 25A or behind fusible links up to 80A (compare NEN 3140 Table 106 and the Electricity Act) for end users including their star-shaped networks up to 230Vac line-to-earth voltage (up to 400Vac line-to-line-to-line voltage)
W**	**LV installations**	work on low-voltage installations and end users whilst opening and closing the entire ring. The entire ring is fed by a single high-voltage transformer. Excluded from any work on low-voltage installations: 1) energizing a low-voltage distribution system by switching on the high-voltage side, and 2) switching static both on and off and rotating (emergency) generators if this requires manual synchronization
W***	**LV installations and also HV end users without distribution**	work as in working area ** (where exclusions continue to apply) and also work on high-voltage end users where no distribution takes place (for example a motor, machine transformer or filter installation).
W****	**LV and HV installations including distribution**	work on low-voltage and high-voltage installations and end users without limitations in voltage levels.

Schematic representation of the working areas

The working areas are shown below to clarify the preceding definitions,

The following applies when reading the drawing:

- xA = circuit breakers up to 25A or fuses up to 80A
- Take note of the distinction between <xA and >xA
- Take note of the distinction between UPS and UPS*, UPS* stands for a fully automatic UPS where no manual synchronization is possible.
- The open-ended lines in the drawing must be interpreted as end users (such as outlets, lights motors, HVAC)



Note 1 of this paragraph: LS in the scheme must be read as LV.

Note 2 of this paragraph: HS in the scheme must be read as HV.

Note 3 of this paragraph: The symbols that have been used in the scheme do not comply with NEN 5152:2016

Profiles (1)

In this document the requirements of competence for the electrotechnician are reflected in a profile combining the role of electrotechnician and the characteristics of the installation as represented in the working area.

The electrotechnician can only be certified according to the underlying profiles, where the employee carrying out the activity is referred to as VP and the person in charge as IVWV. Working areas are designated by one or more stars.

The allowed profiles are:

1. 21101 – VP* (NEN 3140)
2. 21201 – VP** (NEN 3140)
3. 21202 – IVWV** (NEN 3140)
4. 21301 – VP*** (NEN 3140 and NEN 3840)
5. 21302 – IVWV*** (NEN 3140 and NEN 3840)
6. 21401 – VP**** (NEN 3140 and NEN 3840)
7. 21402 – IVWV**** (NEN 3140 and NEN 3840)

More detailed descriptions of the profiles are given in the table on the next two pages.

Profiles (2)

Descriptions of the profiles are given in the table below.

Profile	Description
VP* (21101)	skilled person working on low-voltage installations behind circuit breakers up to 25A or behind fusible links up to 80A (compare NEN 3140 Table 106 and Electricity Act) for end users including subordinate star-shaped networks up to 230Vac line-to-earth voltage (up to 400Vac line-to-line voltage)
VP** (21201)	skilled person working on low-voltage installations and end users, where opening and closing the ring allows the entire ring to be supplied from a single transformer connected to the high-voltage network. Excluded from any work on low-voltage installations: 1) energizing a low-voltage distribution system by switching on the high-voltage side, and 2) switching on and off both static and rotating (emergency) generators if this requires manual synchronization.
IVWV** (21202)	a nominated person in control of an electrical installation and a nominated person in control of a work activity with or during work on low-voltage installations and end users where opening and closing the ring allows the entire ring to be fed and supplied with high-voltage by a single transformer. Excluded from any work on low-voltage installations: 1) energizing a low-voltage distribution system by switching on the high-voltage side, and 2) switching static both on and off and rotating (emergency) generators if it requires manual synchronization.
VP*** (21301)	skilled person working in working area W** (where the exclusions continue to apply) while also working on high-voltage end users where no distribution takes place (e.g. a motor, machine transformer or filter installation). The above-mentioned working area W** is defined as work on low voltage installations and end users where opening and closing the ring allows the entire ring to be fed and supplied with high-voltage by a single transformer. Excluded from any work on low-voltage installations: 1) energizing a low-voltage distribution system by switching on the high-voltage side, and 2) switching on and off both static and rotating (emergency) generators if this requires manual synchronization.

Profiles (2)

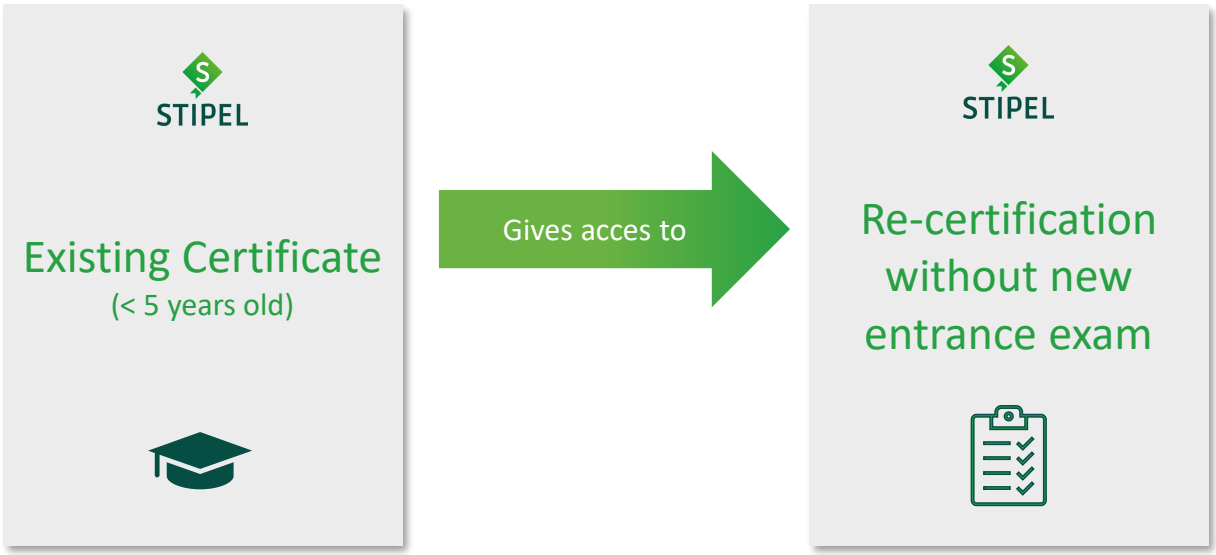
Descriptions of the profiles are given in the table below.

Profile	Description of the profile
IVWV *** (21302)	a nominated person in control of an electrical installation and nominated person in control of a work activity with or during work such as defined in working area W** (where the exclusions continue to apply) while also working on high-voltage end users where no distribution takes place (e.g. a motor, machine transformer or filter installation). The above-mentioned working area W** is defined as work on low voltage installations and end users where opening and closing the ring allows the entire ring to be fed and supplied with high-voltage by a single transformer. Excluded from any work on low-voltage installations: 1) energizing a low-voltage distribution system by switching on the high-voltage side, and 2) switching on and off both static and rotating (emergency) generators if this requires manual synchronization.
VP **** (21401)	skilled person with work on low-voltage and high-voltage installations and end users without any limitation in the level of voltage.
IVWV **** (21402)	a nominated person in control of an electrical installation and nominated person in control of a work activity on low-voltage and high-voltage installations and end users without any limitation in the level of voltage.

Entry matrix

Certificate holders who are in possession of a certificate based on an old profile, that has been issued less than five years ago have access to recertification for the new profiles without an entrance exam in accordance with the entry matrix as shown in Annex B.

Explanation:



Taxonomy of the terms of assessment

The assessment requirements are specified in the terms of assessment. The level and applicability of the assessment requirement are indicated for each profile by a letter code related to the taxonomy of Bloom.

The following letter codes are used:

X = not applicable for this profile

K = knowledge

B = understanding (able to explain; how or why)

T = application

Note of this paragraph: Bloom, B.S. et al, Taxonomy of educational objectives: The classification of educational goals (1956)

Structure of the examination

The examination consists of an entrance exam and a certification test.

- The entrance exam consists of a theoretical examination.
- The certification test consists of a theoretical- and a practical examination (consisting of a part A and/or B depending on the profile)

Part A of the practical examination consists of writing a Uniform Switching Letter. This part of the examination is undertaken by the IVWV-profiles.

Part B of the practical examination consists of two practical assignments. This part of the examination is undertaken by all the VP and IVWV-profiles.

The assessment requirements for each component of examination are shown in Annex C.

Structure of the practical examination part A

During this part of the exam, you may choose between one of the following two models:

- The Uniform Switching Report model alpha, as shown in Annex D
- The Uniform Switching Report model bèta, as shown in Annex E

During practical examination Part A, the candidate will be given an assignment to write out one or more Uniform Switching Letters from the list of possible assignments, which are briefly overviewed in Annex H.

The Uniform Switching Letter must be written by using the applicable single line diagram:

1. single line diagram for low-voltage as shown in Annex F
2. single line diagram for low and high voltage as shown in Annex G

Note 1 of this paragraph : WS has the following definition in the Uniform Switching letter model alfa and model bèta (Annex D and annex E): a workplace isolating device that is connected to the main circuit.

Description of the practical assignments part A

The examination body must present the candidate with an assignment from the selection of assignments prescribed by STIPEL and provided confidentially to examination bodies by STIPEL.

1. Assignments must be written by using a single line diagram.
2. The candidate must complete both assignments if an assignment consists of a first and a second part.
3. The practical examination lasts 60 minutes.

An overview of assignments is shown in Annex H

Assessment of practical examination part A

The Uniform Switching Letter is assessed by using the uniform assessment protocol shown in Annex I

All points indicated in the uniform assessment protocol are deduction points. Every time that the described error is made, the points indicated will be deducted, in the situation that the designation “each time” is used in the column "number of times deductible“. If the designation "1" is used in the same column, then the point deduction will only be made once.

Switching letter assignments consisting of a first and a second part must be assessed using a single uniform assessment protocol.

The pass mark for developing a Uniform Switching Letter is 70 points. At 31 deduction points or more, the candidate has failed.

Structure of practical examination part B

Practical examination part B is prepared under the responsibility of the examination body.

Practical examination part B consists of two practical assignments and must meet the scope described in the paragraph description practical assignment's part B.

The practical assignments must be performed on an installation that meets the requirements of the most recent version of ENG-STIPEL 10001. The installations of the practical exam part B for the profiles in W* and W** must meet the requirements of chapter 6. The installations of the practical exam part B for the profiles in W*** and W**** must meet the requirements of chapter 6 and 7.

Candidates must be tested on the basis of the terms of assessment 13.5-18.2 during the practical exam part B as shown in Annex C.

Each practical examination must be composed of a selection of those assessment points to the extent possible for the particular practical examination. For each category, as applicable to the certification scheme, practical examination Part B must include one or more assessment items.

Description practical assignments part B

General comments regarding practical examination part B:

1. Candidate reads the assignment for each action. Examiner repeats after which candidate carries out the work (candidate has the assignment available to him during the work).
2. Examiner serves as second designated person where necessary.
3. Switching actions must be performed to ensure maximum availability.

Preparatory work VP and IVWV

This paragraph describes the required actions that the candidate must perform before going to the work site.

Preparatory work VP:

1. Study the switching letter in relation to the single line diagram
2. Requests oral permission for each assignment from the examiner
3. Check the availability of required personal protective equipment, measuring instruments and tools.

Preparatory work IVWV:

1. Study the switching letter in relation to the single line diagram
2. Review the assignments and sign them to get permission to start work
3. Check the availability of required personal protective equipment, measuring instruments and tools.

VP*

Practical examination part B consists of two assignments, that encompass the activation and deactivation of a part of an installation, along with operating activities such as:

1. Bringing an electrical circuit back into service for work purposes (motor, wall-socket, lighting-group or a fully automatic UPS);
2. Disconnecting and securing an electrical circuit for work purposes (motor, wall-socket, lighting group or a fully automatic UPS).

The circuit that has been brought back into service, shall not be the same as the one that has been disconnected and secured.

The practical examination has 200 potential deduction points ± 12.5% in accordance with the uniform assessment protocol for practical examination part B and lasts 50 minutes.

VP**

The practical examination part B consists of two assignments, the first one being one practical assignment as described by VP* and:

1. Bringing back into service or disconnecting and securing a connection between low-voltage distributors for work purposes;

or

2. Bringing back into service or disconnecting and securing a distribution system for work purposes.

One assignment must involve bringing back into service and the second assignment must involve disconnecting and securing.

The practical examination has 300 potential deduction points ± 12.5% in accordance with the uniform assessment protocol for practical examination part B and lasts 50 minutes.

VP***

The practical examination part B consists of two assignments, the first one being one practical assignment as described by VP** and

- Bringing back into service or disconnecting and securing a high-voltage power group, e.g. a motor for work purposes.

One assignment must involve bringing back into service and the second assignment must involve disconnecting and securing.

The practical examination has 325 potential deduction points ± 12.5% in accordance with the uniform assessment protocol for practical examination part B and lasts 50 minutes.

VP**

Practical examination part B consists of two assignments, the first one being one practical assignment as described by VP** and:

1. Bringing back into service or disconnecting and securing a transformer for work purposes;

or

2. Switching from one distributor to another transformer;

or

3. Bringing back into service or disconnecting and securing a HV distribution system (station) for work purposes;

or

4. Bringing back into service or disconnecting and securing a generator for work purposes;

or

5. Bringing back into service or disconnecting and securing a UPS without synchronization for work purposes.

Here, one assignment must involve bringing back into service and the second assignment must involve disconnecting and securing.

The practical examination has 500 potential deduction points ± 12.5% in accordance with the uniform assessment protocol for practical examination part B and lasts 75 minutes.

IVWV**

- The practical examination is equivalent to VP**.

IVWV***

- The practical examination is equivalent to VP***.

IVWV****

- The practical examination is equivalent to VP****

Assessment of practical examination part B

For the assessment of the practical examination part B, a uniform assessment protocol as shown in Annex J shall be used. The candidate has 100 points at the start of the practical examination Part B, which always consists of several sub-tasks. All points indicated in the uniform assessment protocol are deduction points. Every time that the described error is made, the points indicated will be deducted. The indicated number of points may be deducted once for each part.

The pass mark for the practical examination part B is 70 points. At 31 deduction points or more, the candidate has failed.

Assessment matrix, pass mark and duration of the theoretical examination (entrance exam)

The assessment matrix for the theoretical examination (entrance exam) is presented in an Excel sheet as shown in Annex K.

Assessment matrix, pass mark and duration of the theoretical examination (certification test)

The assessment matrix for the theoretical examination (certification test) is presented in an Excel sheet as shown in Annex L.

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- Annex B: Entry matrix
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- Annex E: Uniform Switching Letter model bèta
- Annex F: Single-line diagram LV
- Annex G: Single-line diagram LV + HV
- Annex H: Description of practical assignments of practical examination part A
- Annex I: Assessment protocol for practical examination part A
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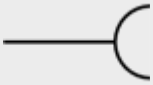
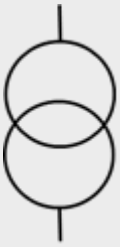
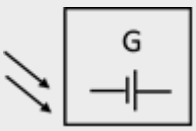
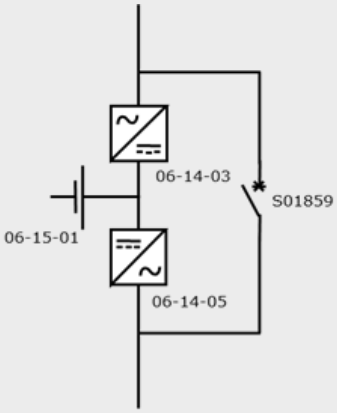
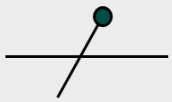
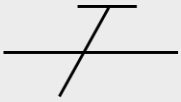
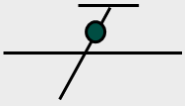
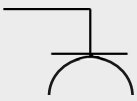
- Annex L: Assessment matrix, pass mark and duration (Certification examination)

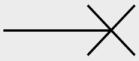
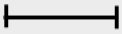
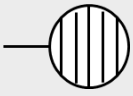
Annex A: Definition of relevant symbols in the single-line diagram

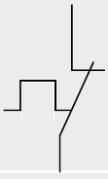
The level of detail in the knowledge of single-line drawing required in test term 10.5 is shown in the table below. The symbols are described in NEN 5152:2016 nl 'Technical drawings - Electrical symbols'.

	Reference NEN 5152	Description	Remarks
	02-15-01	**Earthing**	
	03-01-01	**Conductor**	
	03-03-01	**Contact-bus**	
	06-04-01	**Electrical machine**	Symbol that is indicated in the middle (*) can be changed to: M = Motor G = Generator
	06-09-01	**Transformer**	With two seperate windings.
	06-16-01	**Static-Generator**	
	06-18-06	**Solar Panel**	

	Reference NEN 5152	Description	Remarks
	07-21-08	**Fused disconnector**	
	07-21-09	**Fused load break switch**	
	S01859	**Power switch with disconnect function**	
	S01848	**Combined disconnector with an earthing device**	
	---	**UPS**	Example of a set of standard symbols.

	Reference NEN 5152	Description	Remarks
	11-11-01	**Neutral (N)**	
	11-11-02	**Protective earthing (PE)**	
	11-11-03	**Protective earthing and neutral (PEN)**	
	11-11-04	**Three-phase protective earthing and neutral**	
	11-13-01	**Wall-Socket**	
	11-13-04	**Wall-Socket with protective earthing**	
	11-14-04	**Two-pole switch**	

	Reference NEN 5152	Description	Remarks
	---	**Four-pole switch**	
	11-15-01	**Lighting point**	
	11-15-03	**Lamp**	
	11-15-04	**Fixed fluorescent tube light**	
	11-16-01	**Heat appliance**	
	S01422	**Pump**	
	S01421	**Fan**	

	Reference NEN 5152	Description	Remarks
	02-08-01	**Thermal operated**	
	02-08-02	**Electromagnetic operated**	
	07-09-03	**Self-interrupting thermal contact, bimetallic contact**	
	---	**An installation circuit breaker**	Example of an assembly of standard symbols. NEN5152 has no standard symbol for this. Symbol 07-09-03 must be used as the basis for this with the addition of symbol 02-08-02.

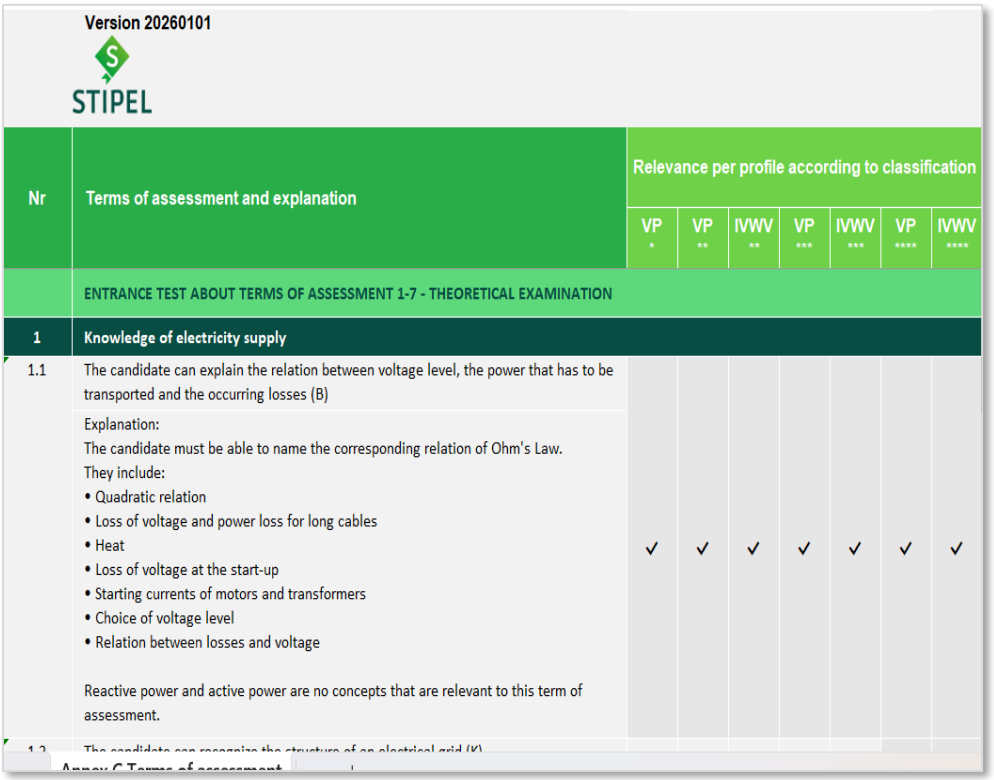
Annex B: Entry matrix

The underlying Excel sheet contains the entry matrix.

Current certificate in underlying row issued less than 5 years ago gives acces to recertification without an entrance exam for the new profiles in the adjacent columns.	21101 – VP*	21201 – VP**	21202 – IVWV**	21301 – VP***	21302 – IVWV***	21401 – VP****	21402 – IVWV****
20911 - VP LV	✓	✓					
20912- VP HV	✓	✓		✓		✓	
20913 – IVWV LV	✓	✓	✓				
20914 – IVWV LV and HV	✓	✓	✓	✓	✓	✓	✓
21101 – VP*	✓						
21201 – VP**	✓	✓					
21202 – IVWV**	✓	✓	✓				
21301 – VP***	✓	✓		✓			
21302 – IVWV***	✓	✓	✓	✓	✓		
21401 – VP****	✓	✓		✓		✓	
21402 – IVWV****	✓	✓	✓	✓	✓	✓	✓

Annex C: Terms of assessment

Click on the image below or on this link to open the full terms of assessment Excel document.



Version 20260101

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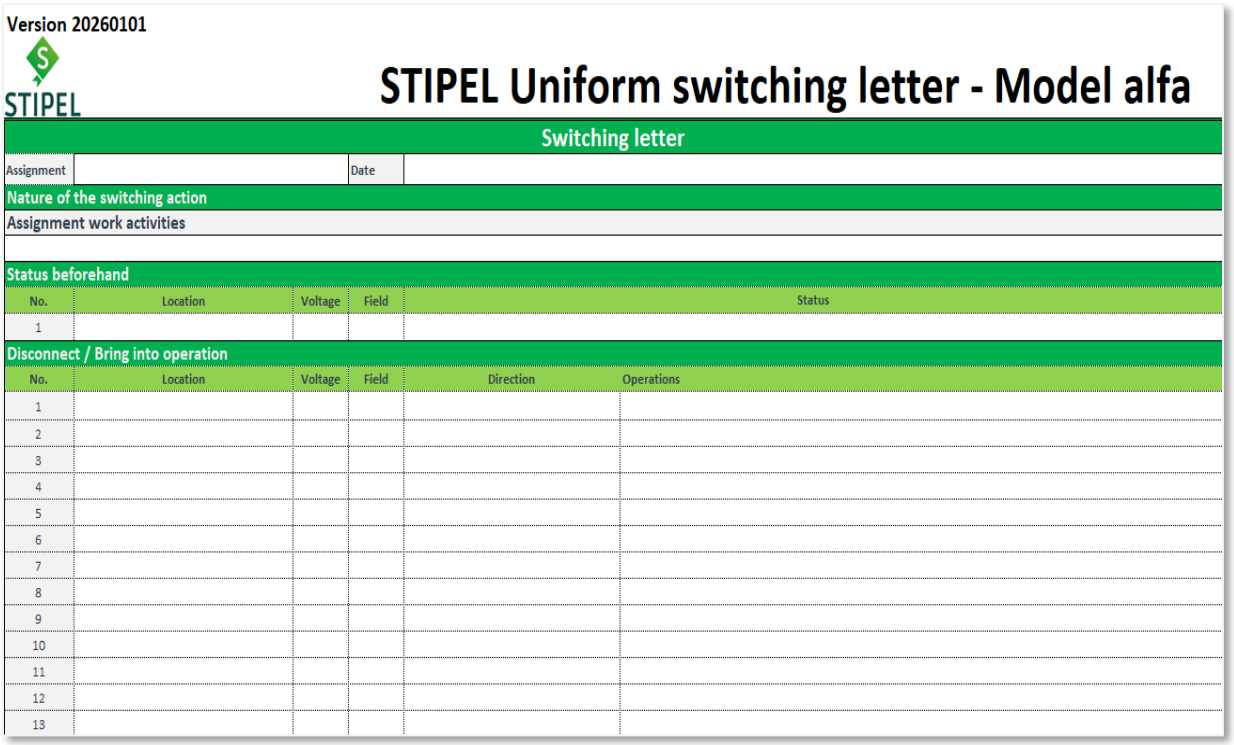
Nr	Terms of assessment and explanation	Relevance per profile according to classification						
		VP *	VP **	IVWV **	VP ***	IVWV ***	VP ****	IVWV ****
	ENTRANCE TEST ABOUT TERMS OF ASSESSMENT 1-7 - THEORETICAL EXAMINATION							
1	Knowledge of electricity supply							
1.1	The candidate can explain the relation between voltage level, the power that has to be transported and the occurring losses (B) Explanation: The candidate must be able to name the corresponding relation of Ohm's Law. They include: • Quadratic relation • Loss of voltage and power loss for long cables • Heat • Loss of voltage at the start-up • Starting currents of motors and transformers • Choice of voltage level • Relation between losses and voltage Reactive power and active power are no concepts that are relevant to this term of assessment.	✓	✓	✓	✓	✓	✓	✓

Annex D: Uniform Switching Letter model alfa

Click on the image below or on this link to open the Uniform Switching Letter model alfa Excel document.



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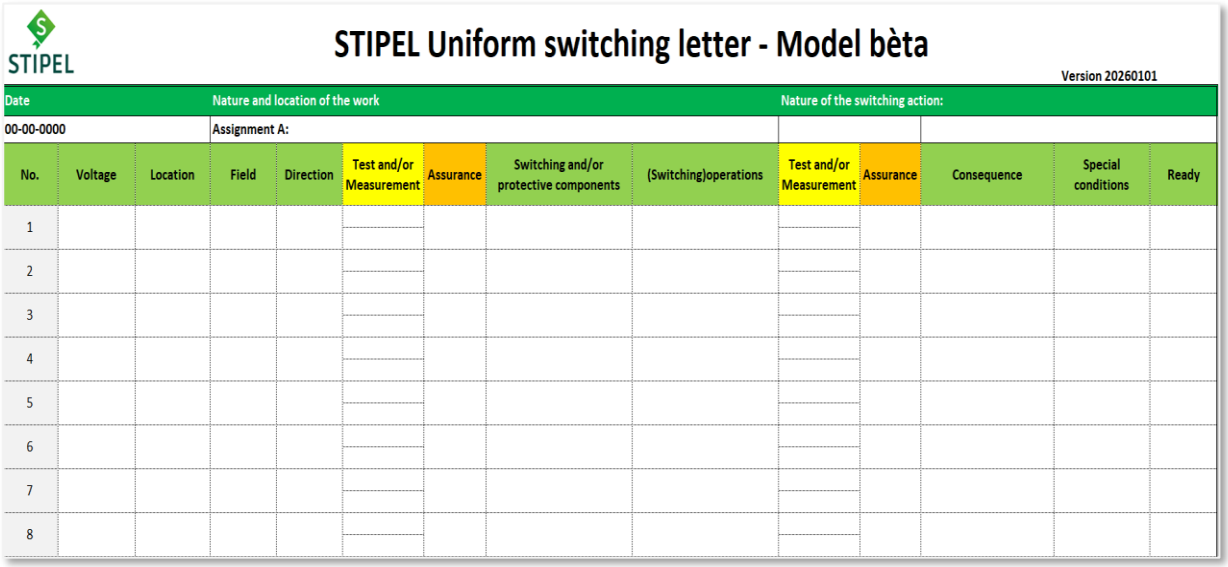
STIPEL Uniform switching letter - Model alfa

Switching letter					
Assignment		Date			
Nature of the switching action					
Assignment work activities					
Status beforehand					
No.	Location	Voltage	Field	Status	
1					
Disconnect / Bring into operation					
No.	Location	Voltage	Field	Direction	Operations
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					

Annex E: Uniform Switching Letter model bèta

Click on the image below or on this link to open the Uniform Switching Letter model bèta Excel document.



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STIPEL Uniform switching letter - Model bèta

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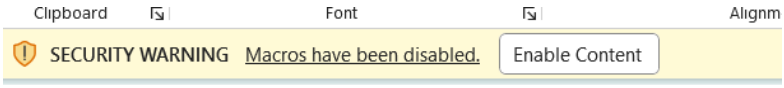
Date			Nature and location of the work						Nature of the switching action:				
00-00-0000			Assignment A:										
No.	Voltage	Location	Field	Direction	Test and/or Measurement	Assurance	Switching and/or protective components	(Switching)operations	Test and/or Measurement	Assurance	Consequence	Special conditions	Ready
1													
2													
3													
4													
5													
6													
7													
8													

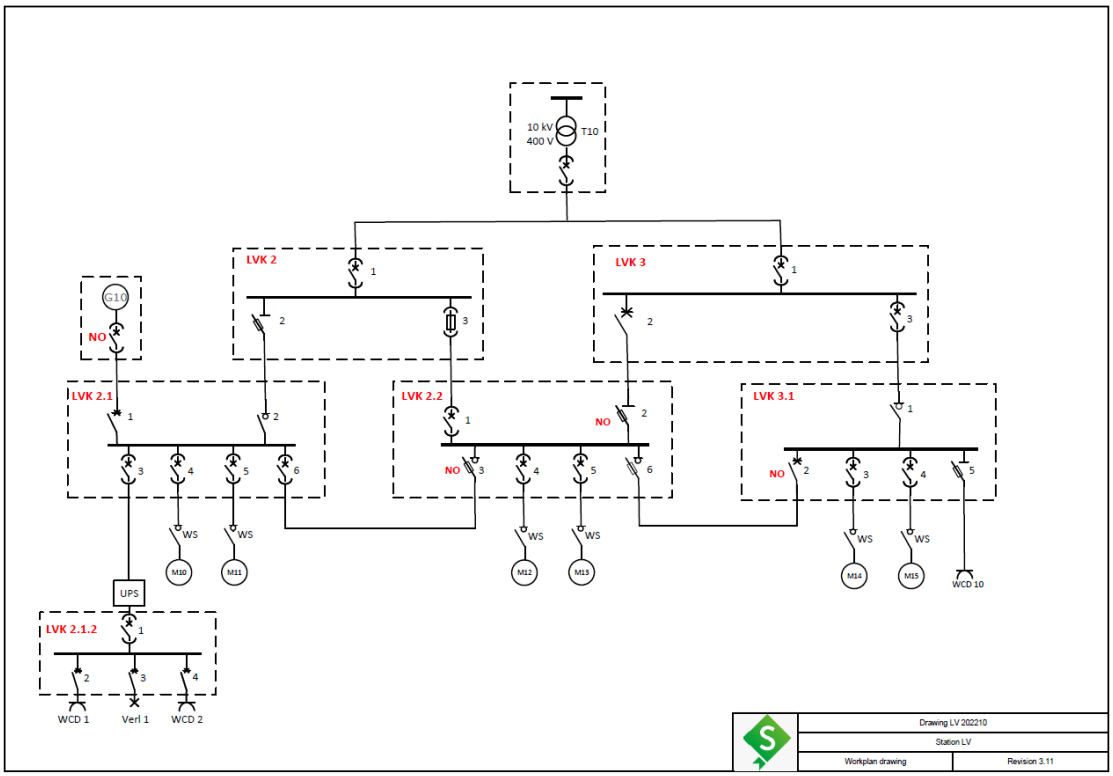
*Note 1 of this annex: To use this Excel file correctly, the editing language should be set to English. Go to **Bestand**> **Opties** > **Taal,** select **Engels** [**English**] and click **Instellen als voorkeur** for both **'Office Weergave Taal'** and **'Bewerkingstalen en taalprogramma's voor Office'.***

Note 2 of this annex: The uniform switching letter model bèta can only be used if the Excel document is saved locally (using "Save As") and the "Enable Content" option is selected when you receive the security warning below.



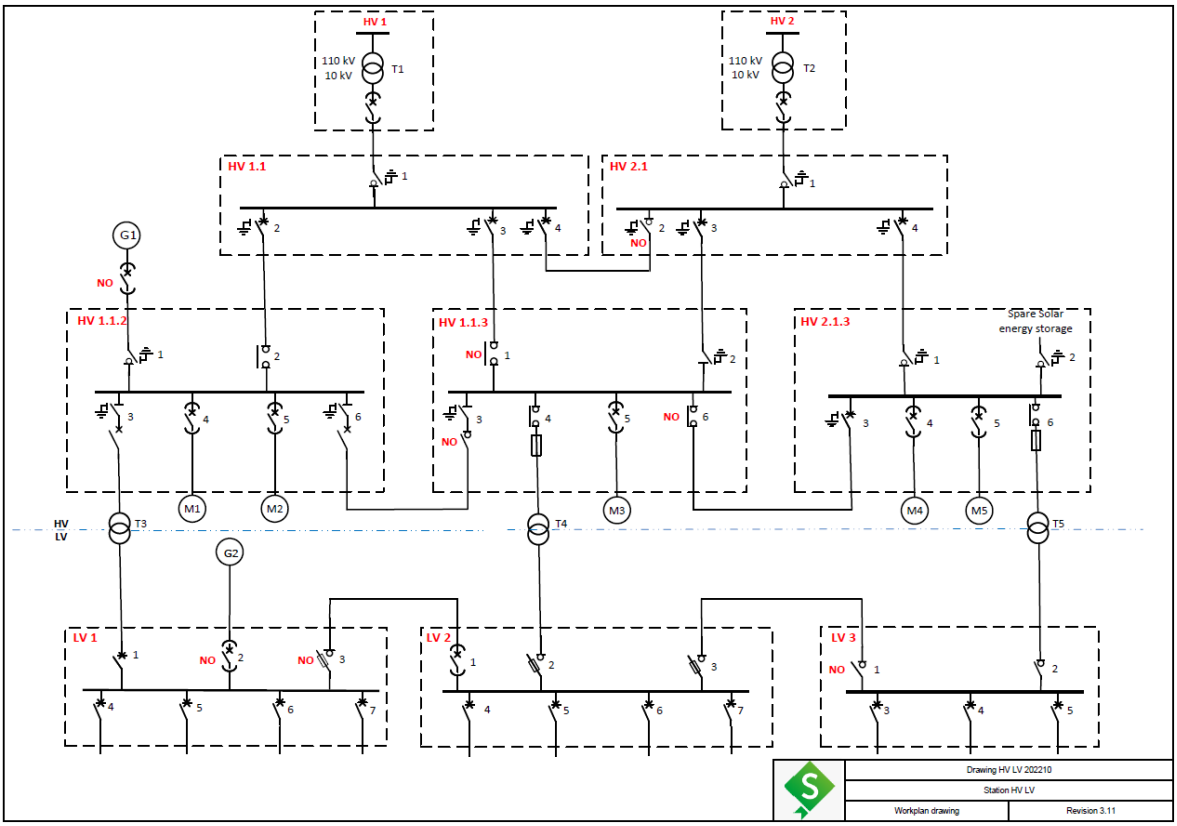
Annex F: Single-line diagram LV

Click on the image below or on this link to open the Single line diagram LV.



Annex G: Single-line diagram LV + HV

Click on the image below or on this link to open the Single line diagram LV + HV.



Annex H: Overview assignments practical examination part A.

Click on the image below or on this link to open an overview of practical assignments for practical examination part A.

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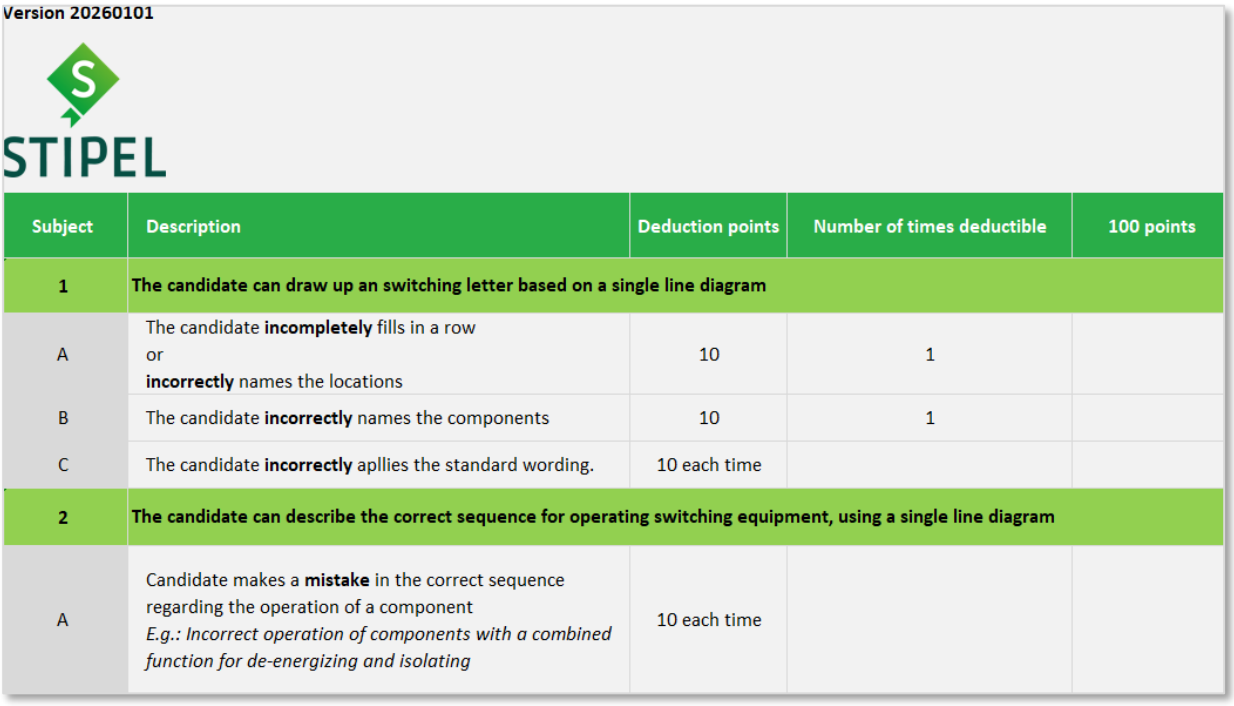
Profile	Assignment	Singe Line Diagram	Description
IVWV****	SB4* 01 Assignment A	Annex G Single Line Diagram LV + HV	A transfomer must be replaced with a new transformer. You disconnect the transformer to be replaced. There may be no power interruption.
	SB4* 01 Assignment B		A cable between two stations has been replaced with a new cable. You put the new cable back into service. There may be no power interruption.
	SB4* 02 Assignment A		A cable between two stations must be replaced with a new cable. You disconnect the cable to be replaced. There may be no power interruption.
	SB4* 02 Assignment B		A transformer must be replaced with a new transformer. You put the new transformer back into service. There may be no power interruption.
IVWV***	SB3* 01 Assignment A	Annex G Single Line Diagram LV + HV	An engine and a cable must be replaced by a new engine and a new cable. The engine must rotate clockwise. You disconnect the engine and cable. The generator(s) is/are (an) emergency power generator(s) that must be started manually.
	SB3* 01 Assignment B		A cable between two stations has been replaced by a new cable. You put the new cable back into service. There may be no power interruption.

Annex I: Assessment protocol for practical examination part A

Click on the image below or on this link to open the assessment protocol for practical examination part A.



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Subject	Description	Deduction points	Number of times deductible	100 points
1	**The candidate can draw up an switching letter based on a single line diagram**			
A	The candidate **incompletely** fills in a row or **incorrectly** names the locations	10	1	
B	The candidate **incorrectly** names the components	10	1	
C	The candidate **incorrectly** apllies the standard wording.	10 each time		
2	**The candidate can describe the correct sequence for operating switching equipment, using a single line diagram**			
A	Candidate makes a **mistake** in the correct sequence regarding the operation of a component *E.g.: Incorrect operation of components with a combined function for de-energizing and isolating*	10 each time		

Annex J: Assessment protocol for practical examination part B

Click on the image below or on this link to open the terms of assessment.

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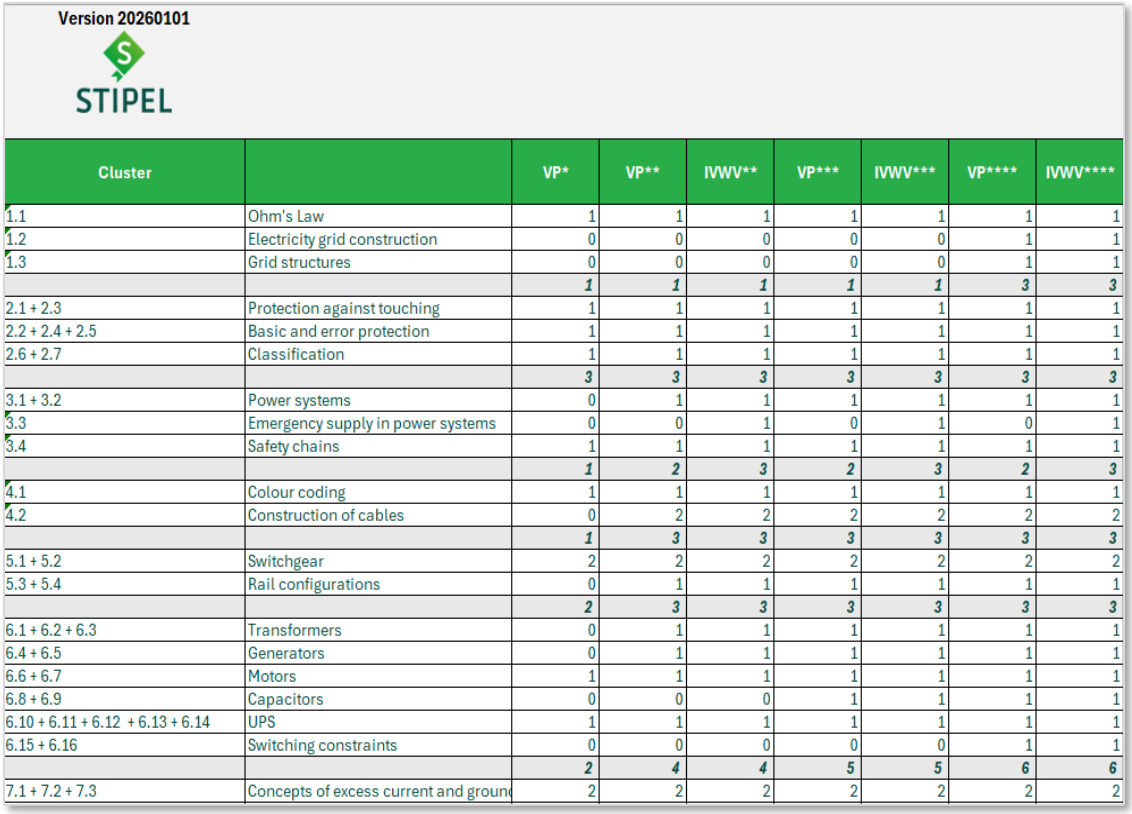
Topic	Description	Term of assesment	Not applicapible profiles	Deduction points	Times deductible	100 points
1	**The candidate prepares tasks thoroughly and proactively**					
A	Candidate doesn't properly apply the information from the switching letter or written assigment.	14.10		10	one time	
B	Candidate **doesn't** ask for oral consent for each assigment	14.12	IVWV** up to IVWV****	10	one time	
C	Candidate **doesn't** sign each assignment before he begins work	14.12	VP* up to VP****	10	one time	
D	The candidate **doesn't** properly carry out proper monitoring of tools, equipment, devices (personal protective equipment).	14.12		10	one time	
2	**Failure to correctly assess a single-line diagram based on a switching letter**					
A	The candidate **doesn't** correctly identify the components.	14		10	1	

Annex K: Assessment matrix, pass mark and duration (Entrance exam)

Click on the image below or on this link to open the assessment matrix, pass mark and duration (Entrance test).



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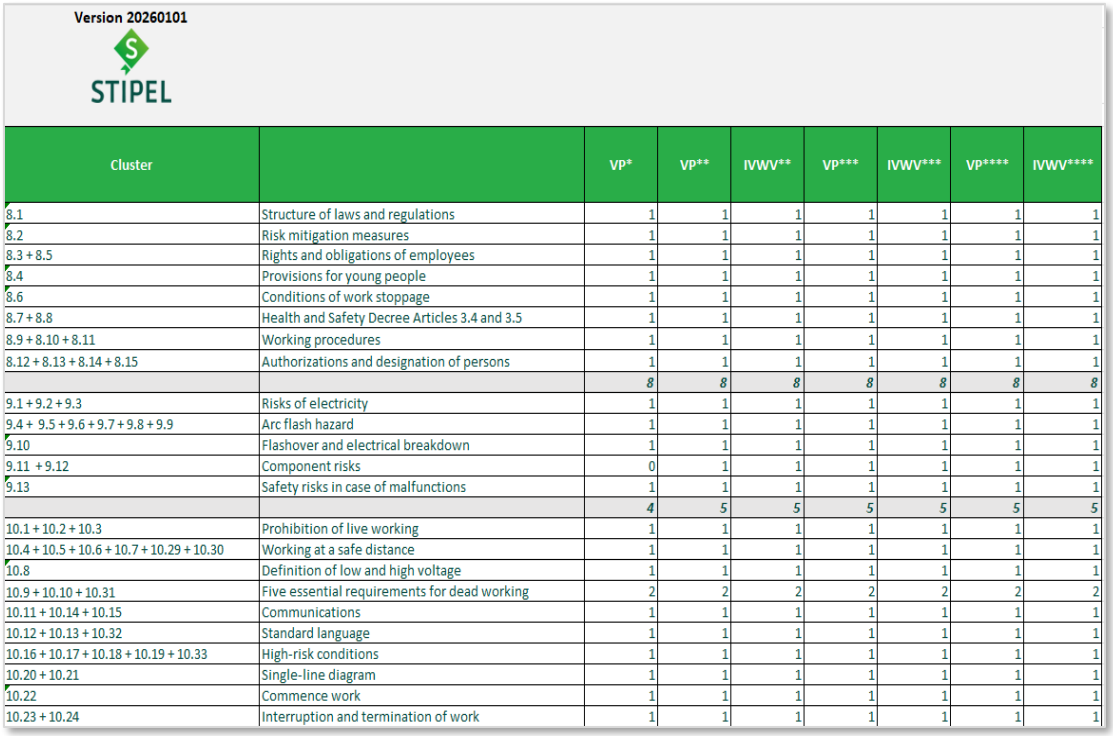
Cluster		VP*	VP**	IVWV**	VP***	IVWV***	VP****	IVWV****
1.1	Ohm's Law	1	1	1	1	1	1	1
1.2	Electricity grid construction	0	0	0	0	0	1	1
1.3	Grid structures	0	0	0	0	0	1	1
		1	***1***	***1***	***1***	***1***	***3***	***3***
2.1 + 2.3	Protection against touching	1	1	1	1	1	1	1
2.2 + 2.4 + 2.5	Basic and error protection	1	1	1	1	1	1	1
2.6 + 2.7	Classification	1	1	1	1	1	1	1
		3	***3***	***3***	***3***	***3***	***3***	***3***
3.1 + 3.2	Power systems	0	1	1	1	1	1	1
3.3	Emergency supply in power systems	0	0	1	0	1	0	1
3.4	Safety chains	1	1	1	1	1	1	1
		1	***2***	***3***	***2***	***3***	***2***	***3***
4.1	Colour coding	1	1	1	1	1	1	1
4.2	Construction of cables	0	2	2	2	2	2	2
		1	***3***	***3***	***3***	***3***	***3***	***3***
5.1 + 5.2	Switchgear	2	2	2	2	2	2	2
5.3 + 5.4	Rail configurations	0	1	1	1	1	1	1
		2	***3***	***3***	***3***	***3***	***3***	***3***
6.1 + 6.2 + 6.3	Transformers	0	1	1	1	1	1	1
6.4 + 6.5	Generators	0	1	1	1	1	1	1
6.6 + 6.7	Motors	1	1	1	1	1	1	1
6.8 + 6.9	Capacitors	0	0	0	1	1	1	1
6.10 + 6.11 + 6.12 + 6.13 + 6.14	UPS	1	1	1	1	1	1	1
6.15 + 6.16	Switching constraints	0	0	0	0	0	1	1
		2	***4***	***4***	***5***	***5***	***6***	***6***
7.1 + 7.2 + 7.3	Concepts of excess current and groun	2	2	2	2	2	2	2

Annex L: Assessment matrix, pass mark and duration (Certification test)

Click on the image below or on this link to open the assessment matrix, pass mark and duration (Certification test).



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Cluster		VP*	VP**	IVWV**	VP***	IVWV***	VP****	IVWV****
8.1	Structure of laws and regulations	1	1	1	1	1	1	1
8.2	Risk mitigation measures	1	1	1	1	1	1	1
8.3 + 8.5	Rights and obligations of employees	1	1	1	1	1	1	1
8.4	Provisions for young people	1	1	1	1	1	1	1
8.6	Conditions of work stoppage	1	1	1	1	1	1	1
8.7 + 8.8	Health and Safety Decree Articles 3.4 and 3.5	1	1	1	1	1	1	1
8.9 + 8.10 + 8.11	Working procedures	1	1	1	1	1	1	1
8.12 + 8.13 + 8.14 + 8.15	Authorizations and designation of persons	1	1	1	1	1	1	1
		8	*8*	*8*	*8*	*8*	*8*	*8*
9.1 + 9.2 + 9.3	Risks of electricity	1	1	1	1	1	1	1
9.4 + 9.5 + 9.6 + 9.7 + 9.8 + 9.9	Arc flash hazard	1	1	1	1	1	1	1
9.10	Flashover and electrical breakdown	1	1	1	1	1	1	1
9.11 + 9.12	Component risks	0	1	1	1	1	1	1
9.13	Safety risks in case of malfunctions	1	1	1	1	1	1	1
		4	*5*	*5*	*5*	*5*	*5*	*5*
10.1 + 10.2 + 10.3	Prohibition of live working	1	1	1	1	1	1	1
10.4 + 10.5 + 10.6 + 10.7 + 10.29 + 10.30	Working at a safe distance	1	1	1	1	1	1	1
10.8	Definition of low and high voltage	1	1	1	1	1	1	1
10.9 + 10.10 + 10.31	Five essential requirements for dead working	2	2	2	2	2	2	2
10.11 + 10.14 + 10.15	Communications	1	1	1	1	1	1	1
10.12 + 10.13 + 10.32	Standard language	1	1	1	1	1	1	1
10.16 + 10.17 + 10.18 + 10.19 + 10.33	High-risk conditions	1	1	1	1	1	1	1
10.20 + 10.21	Single-line diagram	1	1	1	1	1	1	1
10.22	Commence work	1	1	1	1	1	1	1
10.23 + 10.24	Interruption and termination of work	1	1	1	1	1	1	1