STIPEL 20901:2022

Electrotechnician in the industry – English version (NEN 3140 and NEN 3840)

Assessment requirements for the ability to work safely in accordance with the requirements of NEN 3140 and/or NEN 3840 with the authorities of a skilled person or responsible party for installation and work on low-voltage or high-voltage electrical installations

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Foundation for the Certification of Persons Energy technology

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1. Introduction

This document with assessment requirements was developed to enable the certification of candidates in the English language. The Stipel certification was introduced in the Dutch language in 1998 and it has become apparent that there is increasing demand to allow for examination in English as well.

The Stipel certification is used to prove that the staff is sufficiently trained with regards to electro-technical work and operations that can be dangerous. The necessity of proving this competency arises from article 3.5 of the Working Conditions Decree.

The assessment requirements are based on the Dutch standards for operational management of electrical installations, namely NEN 3140 (low voltage) and NEN 3840 (high voltage). Both Dutch standards are an elaboration of the European standard EN 50110-1 and are listed as such in EN 50110-2.

The assessment requirements in this document will be used to study whether certification in English is viable in the form of a pilot project.

Comment 1 for this paragraph: The complete normative references are listed in STIPEL 10001.

Comment 2 for this paragraph: The following translations of authorities are used:

NEN 3140 and NEN 3840	**EN 50110-1**
vakbekwaam persoon (VP)	skilled person
werkverantwoordelijke (WV)	nominated person in control of a work activity
installatieverantwoordelijke (IV)	nominated person in control of an electrical installation during work activities
installatie- en werkverantwoordelijke (IVWV)	nominated person

2. Scope

The NEN 3140 and NEN 3840 distinguish between a number of authorities, including skilled person (VP), nominated person in control of a work activity (WV), and nominated person in control of an electrical installation during work activities (IV). The Stipel certification in English only has two authorities, namely a) skilled person as

executive authority and b) a combination of a nominated person in control of a work activity and of an installation (IVWV) for supervisory authority.

The distinction between low and high voltage is set at 1 kV as in NEN 3140 and NEN 3840. The certification for the high voltage scope always requires the assessment of the candidate against the requirements of both the low voltage scope and high voltage scope.

3. Allowed profiles

The certification is possible for the following profiles:

- STIPEL 20911:2022 VP Low voltage (NEN 3140)
- STIPEL 20912:2022 VP Low and high voltage (NEN 3140 and NEN 3840)
- STIPEL 20913:2022 IVWV Low voltage (NEN 3140)
- STIPEL 20914:2022 IVWV Low and high voltage (NEN 3140 and NEN 3840)

4. Competency profile and job description

The competencies are listed in paragraph 4.2.6 of NEN 3140 and NEN 3840.

The tasks of the skilled person and the nominated person in control of an electrical installation during work activities are described in paragraph 6.3.2 of STIPEL 10001.

5. Examination targets

To obtain the certificate, the candidate must meet the requirements below with regard to general professional and standard knowledge, knowledge and understanding of relevant regulations, and practical skill.

ENTRANCE EXAMINATION (BASIC EXAMINATION)

1.	**Knowledge of the power supply**				
1.1	Knowledge of the power supply	Skilled person Low Voltage	Skilled person Low + High Voltage	Nominated person Low Voltage	Nominated person Low + High Voltage
1.1.1	The candidate can list the structure of the electricity grid (distribution of high and low voltage)	Exempt		Exempt	
1.1.2	The candidate can name the relationship between the amount of voltage and the power to be transported and the occurring losses	Exempt		Exempt	
1.1.3	The candidate can name grid structures such as star grids and ring grids	Exempt		Exempt	

2.	**Touch protection**				
2.1	Structure of basic protection (direct touch) and fault protection (indirect touch)	Skilled person Low Voltage	Skilled person Low + High Voltage	Nominated person Low Voltage	Nominated person Low + High Voltage
2.1.1	The candidate can name the concept of basic protection (direct touch)				
2.1.2	The candidate can name the concept of fault protection (indirect touch)				
2.1.3	The candidate can name both the structure of basic protection (direct touch) and fault protection (indirect touch)				

2.1.4	The candidate can name the structure of basic protection (direct touch)				
2.1.5	The candidate can name the structure of fault protection (indirect touch)				
2.1.6	The candidate can name the structure of grounding and potential equalization				
2.1.7	The candidate can name the classification of an electrical device				
2.1.8	The candidate can name the IP codes of an electrical device				

3.	**Power systems/safety chains**				
3.1	Power systems	Skilled person Low Voltage	Skilled person Low + High Voltage	Nominated person Low Voltage	Nominated person Low + High Voltage
3.1.1	The candidate can name the structure and properties of the following power systems: TT, TN, TN-S, TN-C, TNCS and IT systems				
3.2	Safety chains	Skilled person Low Voltage	Skilled person Low + High Voltage	Nominated person Low Voltage	Nominated person Low + High Voltage
3.2.1	The candidate can name the structure and properties of SELF, FELV, PELV, and S chains				

4.	**Cables and wiring**				
4.1	Elementary concepts regarding cables and wiring	Skilled person Low Voltage	Skilled person Low	Nominated person Low Voltage	Nominated person Low

			+ High Voltage		+ High Voltage
4.1.1	The candidate can name the following concepts:				
	• Conductor				
	• Conductor insulation and cable sheathing				
	• Arming and shielding				

5.	**Switchgear and rail configurations**				
5.1	Elementary concepts regarding switchgear and rail configurations	Skilled person Low Voltage	Skilled person Low + High Voltage	Nominated person Low Voltage	Nominated person Low + High Voltage
5.1.1	The candidate can name the properties of:				
	• Separators				
	• Switch disconnectors				
	• Fuse switches				
	• Power switchers				
	• Relays / contactors				
5.1.2	The candidate can name the properties of the following rail configurations:				
	• Single rail system				
	• Single rail system with sectioning				
	• Double rail system				

5.1.3	The candidate can name the variants of switchgear and rail configurations				

6.	**Devices for generation, conversion, and use**				
6.1	Elementary concepts regarding devices for generation, conversion, and use	Skilled person Low Voltage	Skilled person Low + High Voltage	Nominated person Low Voltage	Nominated person Low + High Voltage
6.1.1	The candidate can name the specific properties and operation of:				
	• Transformers				
	• Generators				
	• Motors				
	• Capacitors				
6.2	Operation and safety measures regarding devices for generation, conversion, and use	Skilled person Low Voltage	Skilled person Low + High Voltage	Nominated person Low Voltage	Nominated person Low + High Voltage
6.2.1	The candidate can name switching limitations due to angular misalignment, a-synchronous, voltage difference, and short-circuit power				

7.	**Protection against overcurrent and grounding fault**				
7.1	Elementary concepts regarding protection against overcurrent and grounding fault	Skilled person Low Voltage	Skilled person Low	Nominated person Low Voltage	Nominated person Low

			+ High Voltage		+ High Voltage
7.1.1	The candidate can name the following concepts:				
	• Overcurrent				
	• Short circuit				
	• Overload				
	• Grounding fault				
	• Selectivity				
7.1.2	The candidate can name the following concepts:				
	• The consequences of overload for conductors, cables, switchgear, transformers, and safety devices				
	• The consequences of short circuit for conductors, cables, switchgear, transformers, and safety devices				
	• Thermal and dynamic short-circuit resistance of conductors, cables, switchgear, transformers and protection devices				
7.1.3	The candidate can name the specific properties of the following elements:				
	• Fuse				
	• Fuse-link				
	• Circuit breaker				
	• Residual current protection				
	• Earth leakage circuit breaker				
	• Thermal protection				

	• Heavy-duty circuit breaker				
	• Motor protection switch				
	• Protection relay	Exempt		Exempt	
	• Overcurrent indicators (overload and short circuit)	Exempt		Exempt	

CERTIFICATION EXAM - THEORY SECTION

8.	**Laws, regulations, and standards**				
8.1	Relevant concepts from the Working Conditions Act	Skilled person Low Voltage	Skilled person Low + High Voltage	Nominated person Low Voltage	Nominated person Low + High Voltage
8.1.1	The candidate can name the risk mitigation measures from article 3 paragraph b				
8.1.2	The candidate can name the rules regarding information/instruction from article 8				
8.1.3	The candidate can name the obligations of employees from article 11				
8.1.4a	The candidate can name the conditions under which he is authorised to cease work (article 29 and 3140 article 4.3)				
8.1.4b	The candidate can name the conditions under which he is authorised to cease work (article 29 and 3840 article 4.3)	Exempt		Exempt	

8.2	Working Conditions Decree article 3.4 and 3.5	Skilled person Low Voltage	Skilled person Low + High Voltage	Nominated person Low Voltage	Nominated person Low + High Voltage
8.2.1	The candidate can name the rules from Working Conditions Decree article 3.4				
8.2.2	The candidate can name the rules from Working Conditions Decree article 3.5				
8.2.3	The candidate can name the difference between a law and a standard				
8.3	Name relevant concepts from NEN 3840.	Skilled person Low Voltage	Skilled person Low + High Voltage	Nominated person Low Voltage	Nominated person Low + High Voltage
8.3.1	The candidate can name the following concepts:				
	• Operational Management				
	• Operation actions				
	• Disconnected				
	• Work while disconnected				
	• Work while connected				
8.3.2a	The candidate can name the two types of operation actions from provision 5.2.1 of NEN 3140				
8.3.2b	The candidate can name the two types of operation actions from provision 5.2.1 of NEN 3840	Exempt		Exempt	

8.3.3a	The candidate can name the various persons and their responsibilities and authorities regarding the designation policy of the NEN 3140				
8.3.3b	The candidate can name the various persons and their responsibilities and authorities regarding the designation policy of the NEN 3840	Exempt		Exempt	

9.	**Dangers of electricity**				
9.1	Risks of working with electricity	Skilled person Low Voltage	Skilled person Low + High Voltage	Nominated person Low Voltage	Nominated person Low + High Voltage
9.1.1	The candidate can name the effect of electricity on the human body				
9.1.2	The candidate name the concept of electric shock				
9.1.3	The candidate can name the consequences of touching an energized part				
9.1.4	The candidate can name the risks of an arc				
9.1.5	The candidate can name the risks of an arc jump	Exempt		Exempt	
9.2	Risks of working with components of electrical installations	Skilled person Low Voltage	Skilled person Low + High Voltage	Nominated person Low Voltage	Nominated person Low + High Voltage
9.2.1	The candidate can name the electrical risks of transformers, motors, capacitors, and switchgear				
9.2.2	The candidate can recognize electrical risks				

10.	Operation and safety measures				
10.1	Standard work procedures in accordance with NEN 3840	Skilled person Low Voltage	Skilled person Low + High Voltage	Nominated person Low Voltage	Nominated person Low + High Voltage
10.1.1	The candidate can name the operational procedure for the danger zone				
10.1.2	The candidate can name the following concepts:				
	• Danger zone				
	• Work place				
	• Proximity zone	Exempt		Exempt	
10.1.3	The candidate knows the distances for measurement, operation, and work (NEN 3140)				
10.1.4	The candidate knows the distances for work (NEN 3840)	Exempt		Exempt	
10.1.5	The candidate knows the distances for the danger zone and proximity zone (NEN 3840)	Exempt		Exempt	
10.1.6	The candidate knows the values for the normalized voltage levels				
10.2	The five essential safety measures	Skilled person Low Voltage	Skilled person Low + High Voltage	Nominated person Low Voltage	Nominated person Low + High Voltage
10.2.1	The candidate can name the five essential safety measures for working without voltage in the correct order				
10.2.2	The candidate can name the following concepts:				

	• Separation				
	• Securing against reactivation				
	• Checking whether the installation is disconnected (NEN 3140)				
	• Checking whether the operating voltage is disconnected (NEN 3840)	Exempt		Exempt	
	• Grounding and short circuit				
	• Protection regarding nearby active parts				
10.3	Prevention measures before work starts	Skilled person Low Voltage	Skilled person Low + High Voltage	Nominated person Low Voltage	Nominated person Low + High Voltage
10.3.1	The candidate can name error and alarm notifications in the correct manner				
10.3.2	The candidate can use standard language				
10.3.3	The candidate can evaluate a work plan				
10.3.4	The candidate can communicate in the indicated manner				
10.3.5	The candidate can evaluate a work procedure				
10.4	Safety measures for risk-increasing conditions	Skilled person Low Voltage	Skilled person Low + High Voltage	Nominated person Low Voltage	Nominated person Low + High Voltage
10.4.1	The candidate can name measures for work in cramped conducive spaces				
10.4.2	The candidate can name measures for work in damp spaces				

10.4.3	The candidate can name measures for work in unfavourable weather conditions				
10.5	Information for performing work	Skilled person Low Voltage	Skilled person Low + High Voltage	Nominated person Low Voltage	Nominated person Low + High Voltage
10.5.1	The candidate can name the application and operation of a:				
	• Single line diagram				
	• Installation diagram				
	• Installation drawing				
	• Circuit diagram				
10.6	Start and end work in the correct manner	Skilled person Low Voltage	Skilled person Low + High Voltage	Nominated person Low Voltage	Nominated person Low + High Voltage
10.6.1	The candidate can assess whether all measures have been taken in order to start work in a safe manner				
10.6.2	The candidate can name the measures in case of a work interruption				
10.6.3	The candidate can name the measures to end work				
10.7	Carrying out work and commissioning installation in the correct manner	Skilled person Low Voltage	Skilled person Low	Nominated person Low Voltage	Nominated person Low

			+ High Voltage		+ High Voltage
10.7.1	The candidate can name the preparatory activities				
10.7.2	The candidate can name which measures are necessary during execution				
10.7.3	The candidate can name in which way the installation is commissioned				

11.	**Tools, resources, PPE, testing and measuring equipment**				
11.1	Properties of and requirements regarding tools, resources, and PPE	Skilled person Low Voltage	Skilled person Low + High Voltage	Nominated person Low Voltage	Nominated person Low + High Voltage
11.1.1	The candidate can name which tools, resources, and PPE protect against electrocution				
11.1.2	The candidate can name which tools, resources, and PPE protect against arcs				
11.1.3	The candidate can name which requirements the tools, resources, and PPE used must meet during electrical work				
11.2	Use of tools, resources, and PPE	Skilled person Low Voltage	Skilled person Low + High Voltage	Nominated person Low Voltage	Nominated person Low + High Voltage
11.2.1	Void	Exempt	Exempt	Exempt	Exempt

11.2.2	The candidate can assess when the tools, resources, and PPE listed in 11.1.1 and 11.1.2 must be used	Exempt	Exempt		
11.3	Properties of and requirements regarding testing and measuring equipment	Skilled person Low Voltage	Skilled person Low + High Voltage	Nominated person Low Voltage	Nominated person Low + High Voltage
11.3.1	The candidate can name the application and operation of:				
	• Phase comparison equipment				
	• Dual-pole voltage indicator				
	• Multimeter				
	• Single-pole voltage indicator	Exempt		Exempt	
	• Testing equipment				
	• Current clamp				
	• Rotary field instrument				

12.	**Standard and additional operational management procedures**				
12.1	Inspection	Skilled person Low Voltage	Skilled person Low + High Voltage	Nominated person Low Voltage	Nominated person Low + High Voltage
12.1.1	The candidate can name the procedures for inspection of work equipment	Exempt	Exempt		
12.1.2	The candidate can name the procedures for inspection of installations	Exempt	Exempt		

12.2	Switching operations	Skilled person Low Voltage	Skilled person Low + High Voltage	Nominated person Low Voltage	Nominated person Low + High Voltage
12.2.1	The candidate can name the procedures for switching operations with transformers	Exempt	Exempt		
12.2.2	The candidate can name the procedures for switching operations in grid structures	Exempt	Exempt		

CERTIFICATION EXAM - PRACTICAL SECTION

13.	**Dangers of electricity**				
13.1	Dangers of electricity	Skilled person Low Voltage	Skilled person Low + High Voltage	Nominated person Low Voltage	Nominated person Low + High Voltage
13.1.1	The candidate can recognize all the components included in an electrical installation				
13.1.2	The candidate can operate all the components included in an electrical installation in the correct manner				
13.1.3	The candidate can secure all the components included in an electrical installation in the correct manner				

14.	**Operation and safety measures**				
14.1	Standard work procedures in accordance with NEN 3840	Skilled person Low Voltage	Skilled person Low + High Voltage	Nominated person Low Voltage	Nominated person Low + High Voltage
14.1.1	The candidate can apply the concepts as listed under 10.1.2				
14.1.2	The candidate can apply the distances for measurement, operation, and work (NEN 3140)				
14.1.3	The candidate can apply the distances for the danger zone and proximity zone (NEN 3840)	Exempt		Exempt	

14.2	The essential safety measures	Skilled person Low Voltage	Skilled person Low + High Voltage	Nominated person Low Voltage	Nominated person Low + High Voltage
14.2.1	The candidate can apply the correct essential safety measures during commissioning and decommissioning				
14.3	Prevention measures before work starts	Skilled person Low Voltage	Skilled person Low + High Voltage	Nominated person Low Voltage	Nominated person Low + High Voltage
14.3.1	The candidate can create a safe work environment				
14.3.2	The candidate can evaluate whether a work place is and will remain secure				
14.3.3	The candidate can use standard language				
14.3.4	The candidate can draw up a work plan	Exempt	Exempt		
14.3.5	The candidate can evaluate a work plan				
14.3.6	Void	Exempt	Exempt	Exempt	Exempt
14.3.7	Void	Exempt	Exempt	Exempt	Exempt
14.3.8	The candidate can draw up a work procedure	Exempt	Exempt		
14.3.9	The candidate can evaluate an operations plan				
14.3.10	The candidate can give permission for the execution of work	Exempt	Exempt		
14.3.11	The candidate can give permission for safety measures	Exempt	Exempt		
14.3.12	The candidate can give permission for operational measures	Exempt	Exempt		

14.3.13	The candidate can give permission to reset fault indicators	Exempt	Exempt		
14.3.14	The candidate can reset error and alarm notifications in the correct manner				
14.4	Information for performing work	Skilled person Low Voltage	Skilled person Low + High Voltage	Nominated person Low Voltage	Nominated person Low + High Voltage
14.4.1	The candidate can evaluate drawings and documents about the operation of the installation and execution of the work				
14.5	Start and end work in the correct manner	Skilled person Low Voltage	Skilled person Low + High Voltage	Nominated person Low Voltage	Nominated person Low + High Voltage
14.5.1	The candidate can evaluate when the work can begin				
14.5.2	The candidate can evaluate when the work has ended				
14.5.3	The candidate can evaluate whether the work has been carried out correctly				
14.5.4	Void	Exempt	Exempt	Exempt	Exempt
14.5.5	The candidate can evaluate the order of the operation actions				

15.	**Tools, resources, and PPE**				
15.1	Use of tools, resources, and PPE	Skilled person Low Voltage	Skilled person Low	Nominated person Low Voltage	Nominated person Low

			+ High Voltage		+ High Voltage
15.1.1	The candidate can use the tools, resources, and PPE listed in 11.1.1 and 11.1.2				
15.1.2	The candidate can assess when the tools, resources, and PPE listed in 11.1.1 and 11.1.2 must be used	Exempt	Exempt		

16.	**Testing and measuring equipment**				
16.1	Use of standard testing and measuring equipment	Skilled person Low Voltage	Skilled person Low + High Voltage	Nominated person Low Voltage	Nominated person Low + High Voltage
16.1.1	The candidate can evaluate the standard testing and measuring equipment listed under 11.3.1 for the right conditions				
16.1.2	The candidate can use the standard testing and measuring equipment listed under 11.3.1				
16.1.3	The candidate can read out the standard testing and measuring equipment listed under 11.3.1				
16.1.4	The candidate can evaluate the measurement results of the standard testing and measuring equipment listed under 11.3.1				

17.	**Power systems/safety chains**

17.1	Power systems	Skilled person Low Voltage	Skilled person Low + High Voltage	Nominated person Low Voltage	Nominated person Low + High Voltage
17.1.1	The candidate can recognize the power system used for the installation				
17.1.2	The candidate can apply the right measurements for the power system used for the installation				

18.	**Protection against overcurrent and grounding fault**				
18.1	Protection against overcurrent and grounding fault	Skilled person Low Voltage	Skilled person Low + High Voltage	Nominated person Low Voltage	Nominated person Low + High Voltage
18.1.1	The candidate can recognize the types of security devices listed under 7.1.3				
18.1.2	The candidate can operate the types of security devices listed under 7.1.3 in the correct manner				

19.	**Switchgear and rail configurations**				
19.1	Switchgear and rail configurations	Skilled person Low Voltage	Skilled person Low + High Voltage	Nominated person Low Voltage	Nominated person Low + High Voltage
19.1.1	The candidate can recognize the types of switchgear listed under 5.1.1				

19.1.2	The candidate can operate the types of switchgear listed under 5.1.1 in the correct manner				
19.1.3	The candidate can evaluate the correct use of switchgear listed under 5.1.1				
19.1.4	The candidate can recognize the types of rail configurations listed under 5.1.2				
19.1.5	The candidate can operate the types of rail configurations listed under 5.1.2 in the correct manner				
19.1.6	The candidate can evaluate the correct use of rail configurations listed under 5.1.2				

6. Examination method

The exam consists of the following parts:

- a basic exam in accordance with paragraph 21.1 of STIPEL 10001;
- a theory section of the certification exam in accordance with paragraph 22 of STIPEL 10001;
- one or more practical sections in accordance with paragraph 23 of STIPEL 10001:

The theoretical exams are considered passed if at least 70% of the maximum number of points for the questions has been obtained.

The recertification is possible in accordance with paragraph 25 of STIPEL 10001.

7. Exam matrices

The exam matrix for the basic exam for each of the profiles is:

Examination targets		Number of questions			
		Skilled person Low Voltage	**Skilled person Low + High Voltage**	**Nominated person Low Voltage**	**Nominated person Low + High Voltage**
1	Knowledge of the power supply	X	2	X	2
2	Touch protection	3	3	3	3
3	Power systems and safety chains	3	3	3	3
4	Cables and wiring	3	3	3	3
5	Switchgear and rail configurations	3	3	3	3
6	Devices for generation, conversion, and use	4	4	4	4
7	Protection against overcurrent and grounding fault	4	4	4	4
	Total	20	22	20	22

The exam matrix for the theory section for each of the profiles is:

Examination targets		Number of questions			
		Skilled person Low Voltage	**Skilled person Low + High Voltage**	**Nominated person Low Voltage**	**Nominated person Low + High Voltage**
8	Laws, regulations, and standards	7	7	7	7
9	Dangers of electricity	5	5	5	5
10	Operation and safety measures	10	14	10	14
11	Tools, resources, PPE, and testing and measuring equipment	8	12	8	12
12	Standard and special operational management procedures	X	X	4	6
	Total	30	38	34	44

The practical examination for the Skilled Person Low Voltage and VP Low + High Voltage profiles consists of the performance of one or more practical assignments in accordance with STIPEL 20016 that cover test terms 13 through 19.

The practical examination for the profiles Nominated Person Low Voltage and Nominated Person Low + High Voltage consists of two parts in accordance with STIPEL 20016 covering the exam terms 13 to 19, namely:

- Drawing up one or more work and operation plans (Part A);
- Carrying out one or more practical assignments (Part B)

8. Entry into force

This diagram is used for a pilot project.

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