

## AB ORLEN LIETUVA ELECTRICAL AND AUTOMATION DEPARTMENT

930-00. OS-3 FLARE SECTION RECONSTRUCTION

(rev. 0)

2025-10-09

Juodeikiai Vill., Mažeikiai Distr. Municipality

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| OWNER | AB ORLEN Lietuva |
| OBJECT (FACILITY) ID: | 930-00 OSBL utilities and Flare Section |
| OWNER'S DESIGN No.: | OLP02729 |
| OWNER’S  TITLE: | 930-00. OS-3 Flare Section Reconstruction |
| TYPE OF CONSTRUCTION: | Maintenance |
| DESIGN PART: | Electrical |
| DESIGN PHASE: | detailed engineering design (DD) |
| DESIGNER: | Designing company |

## GENERAL REQUIREMENTS:

* 1. The Design shall comply with the Rules for Installation of Electrical Equipment (hereinafter – EĮĮT), including all applicable provisions, the regulatory documents of the Republic of Lithuania (hereinafter – LR), the Technical Regulations for Construction (hereinafter – STR), and the OWNER’S requirements.
  2. The DESIGNER shall hold all permits and certificates required under LR legislation, authorizing the execution of design activities as specified in this design task.
  3. The design process shall encompass engineering studies (evaluation of existing equipment, analysis and verification of documents, site inspection, any additional actions necessary to assess current conditions and identify appropriate design solutions), the preparation of electrical design, including the grounding, lighting protection and overvoltage protection for associated equipment. Additional design disciplines shall be incorporated as needed to ensure the proper installation and reliable operation of the facility.
  4. The title block of design documentation and drawings shall display the facility identification number and the Owner’s design identification number.
  5. Design documentation (title page, explanatory note, comments and explanations provided in design drawings) shall be developed in the Lithuanian language. Other documents may be in English.
  6. OWNER will provide methodical support regarding the use of existing elements of the facility. DESIGNER shall visit the site and use collected information in the development of design solutions.
  7. DESIGNER shall comply with the confidentiality requirements established by the Company to be able to independently work with the design-related documents stored at the Company's Technical Archive.
  8. The DESIGNER shall be authorized to perform works inside operating electrical facilities for the evaluation of diagrams and electrical equipment.
  9. When developing design, DESIGNER shall follow the technical requirement and SOWs provided by the OWNER and, considering the scope of design, to include technical requirements for equipment and scope of works provided by the Owner in the design documentation. However, the DESIGNER shall be responsible for the correctness of design solutions and their conformity to the applicable legal requirements.
  10. All works that can be reasonably considered necessary for the completion of installation work completion and proper operation of the system shall be performed even if they are not specified in the drawings or described in this document.

The Design shall include the documents indicated in Attachment 4.1; however, additional documents, which the DESIGNER finds important, may be developed to support the design solutions.

* 1. Electrical cable lines shall be numbered based on the cable coding system provided in Attachment 4.2.
  2. Attachment 4.3 contains the list of abbreviations for design, upgrade and operational control of power facilities – they must be used in the design.
  3. Attachment 4.4 provides a harmonized cable coding table to be observed when selecting cables.
  4. Newly designed equipment shall meet the OWNER’S electro-technical requirements provided in Attachment 4.6 'Technical Specifications' (in English), and the equipment shall be selected from the list of manufacturers provided in Attachment 4.5 (exceptions possible, if approved by the OWNER).
  5. The following documents shall be submitted to the OWNER for review and comments: main drawings, schematics, specifications, and bills of materials, each with a minimum completeness of 80%, provided in electronic format (.dwg and .pdf). For final approval, the original design documentation (Revision 0), free of any references to corrections or intermediate revisions used for commenting, shall be submitted in printed form. The submission must be signed by at least two authorized representatives: the DESIGNER (design developer or electrical design part manager) and the head of the DESIGNER company responsible for verifying the design documents. The Design shall be coordinated and agreed upon with the OWNER’S designated employees as listed in the 'Design Documents and Drawings Coordination Form'. The Owner's Senior Engineer / Engineer of Technical Inspection and Analysis Group of Electrical and Automation Department shall approve the Design by stamping the Design documentation accordingly. Once coordinated and signed, design documents in editable electronic format (.dwg, .doc, etc.) shall be provided by e-mail via the OWNER’S file transfer system NextFile ([https://nextfile.orlen.pl](https://nextfile.orlen.pl/)) to the Technical Inspection and Analysis Group employee having coordinated the design, to the Owner assigned work supervisor (coordinator) for transfer to the Archive – in the procedure and form established by the OWNER.
  6. Design documentation shall be submitted for agreement and final approval in accordance with the OWNER'S procedures and the requirements of this document.
  7. The Design shall be agreed with the indicated OWNER'S employees, including:
     1. Maintenance Department Senior Electrical Engineer / Engineer; 1.18.2. Work supervisor (coordinator) appointed by the OWNER;
     2. Technical Inspection and Analysis Group Manager, Technical Inspection and Analysis Group employee having prepared this document, or another person indicted at the end of this document;
     3. OWNER’S Project Manager.
  8. The designed electrical equipment shall be selected in consideration of Ex zones, category of explosive mixtures and temperature class.
  9. Power distribution installations and networks shall be designed with minimum 30% power reserve and 20% capacity reserve.
  10. The Design shall provide for suitable protections to power users and give the calculated protection settings.
  11. Commutation equipment (automatic circuit breakers, circuit breakers, breakers, disconnectors, earth switches, equipment controls, etc.) used for the connection of voltage to circuits shall have padlock installation possibilities, which usually are provided by manufacturer and used for locking in disconnected position (LOTO function).
  12. The Design shall include minimum one-phase short-circuit current, voltage loss, load etc. calculations and ensure selective operation of the existing and designed protection devices.
  13. The Design shall include the dismantling of obsolete elements (relays, cables) and unnecessary equipment, specify the respective scope of work.
  14. If the Design includes connections of new power users to the existing switchgear, power control cabinet, distribution or power supply panel, or replacement of the existing users, an updated single-line diagram of the entire panel with the existing and newly designed users shall be developed. Single-line and original design diagrams shall be used while developing the schematics, however the Designer shall check the accuracy of information specified therein during site visits and, if necessary, perform voltage, current, power measurements upon submittal of a request to the OWNER’S Work Supervisor to organize such measurements.
  15. Cables shall be installed in the existing cable trays, with new trays designed where necessary. Cable arrangement within cabling units shall be consistent with the existing system. Power cables shall not be installed in structures (trays, ladders, tubes, etc.) containing control, instrumentation, electronic communication system cables.
  16. When designing mechanical protections with flexible conduits, provide for steel or and/or steel- plastic conduits with cable connectors (seals), as specified by the conduit manufacturer.
  17. Where necessary, civil/structural drawings for installation of new cable trays, control panels and access platforms shall be developed by the CONTRACTOR.
  18. The designed equipment shall be suitable for the ambient conditions on site. Cable and steel structures shall be suitable for use in C4 environment. Minimum required zinc coating on hot-dip galvanized structures is 60 µm. If an alternative corrosion protection method is applied, it shall provide a level of protection equivalent to hot-dip galvanization, ensuring a minimum service life of 20 years. The minimum wall thickness of wiring ducts shall be 1.5 mm.
  19. The existing earthing devices shall be used for the designed equipment. If the existing earthing devices cannot be used or they are not suitable, new devices shall be designed.

## SCOPE OF DESIGN:

* 1. Designing electrical cabinets for power supply to D-2 and D-4 electrical equipment.
  2. Designing lighting systems for D-2 and D-4 flares and associated work areas.
  3. Designing electric heat tracing for piping, instrumentation cabinets, and other equipment.
  4. Designing power supply systems for motor operated valves and other electrical equipment.
  5. Designing earthing systems for the new equipment.

## SPECIFICS OF DESIGN SCOPE:

### Designing electrical cabinets PS-1 and KS-1 to supply power to D-2 electrical equipment as well as electrical cabinets PS-6 and KS-2 to supply power to D-4 electrical equipment.

* + 1. The connection of PS-5 shall be arranged from TP-22 JVS-2 n.4-1/1. The connection of KS-1 shall be arranged from TP-22 PS-2 (the exact connection point shall be coordinated during the design phase). The connection of PS-6 shall be arranged from TP-22 JVS-2 n.11-2/1. The connection of KS-2 shall be arranged from TP-22 PS-2 (the exact connection point shall be coordinated during the design phase). Equipment requiring uninterrupted power supply, such as the flare operation controller and similar systems, shall be powered from electrical cabinets KS-1 and KS-2. All other equipment, including motor operated valves, heat tracing for piping and instrumentation, lighting, etc., shall be powered from electrical cabinets PS-5 and PS-6.
    2. Necessary modifications shall be made in the cable connection cubicles, including installation of new circuit breakers, intermediate terminals, and other required components).
    3. Cables designated for connecting the electrical cabinets shall be selected and sized to support a load at least 200% greater than the demand of the designed equipment. Exact cable specifications, required electrical power, and other parameters will be provided during the design phase.
    4. Each cabinet door shall be equipped with a white indicator light to signal the presence of voltage inside the cabinet.
    5. The sides of cabinets PS-5 and PS-6 shall include three 16A Schuko-type sockets and one 32A 3P+N+PE three-phase socket.
    6. Incoming automatic circuit breakers shall be installed at the cabinet inlets.
    7. Cable lines connected to the cabinets shall be routed through intermediate terminal blocks and protected by a dedicated automatic circuit breaker.
    8. All cabinets shall be equipped with anti-condensation heating. The heating systems for cabinets KS-1 and KS-2 shall be powered via cabinets PS-5 and PS-6.
    9. The cabinet shall be sized to provide at least 200% of the space required for the current project scope, allowing for the future installation of additional equipment in subsequent projects. The exact quantity, type, specifications, required electrical power, and other parameters of the equipment will be provided during the design phase.
    10. Incoming automatic circuit breakers shall be selected to accommodate future (prospective) loads. Details of the prospective loads will be provided during the design phase.
    11. Additional cable inlets and space for intermediate terminal blocks shall be designed to support future connections.
    12. The installation location of the cabinets shall be determined during the design phase, in coordination with other discipline leads and the OWNER.

### Designing lighting systems for D-2 and D-4 flares and associated work areas.

* + 1. The lighting for the site and work areas shall be designed in accordance with the Lithuanian hygiene standard HN 98:2014 'Natural and Artificial Lighting of Workplaces. Limit Values of Light Intensity and General Measuring Requirements’. The layout, type, and installation method of luminaires shall be coordinated with the OWNER and other discipline leads during site visit and construction.
    2. The Designer shall provide lighting distribution calculations and corresponding drawings.

### Designing electric heating for equipment in coordination with the leads of other project disciplines.

* + 1. Electric heating and connection of electric heating equipment shall be designed in coordination with the leads of other project disciplines.
    2. The Design shall include integration of two status signals into the automated control system: ‘Fault’ (triggered when least one circuit breaker supplying the heat tracing cables trips due to protection) and ‘Scheme ready’ (triggered when all circuit breakers supplying the heating system are in the closed (ON) position). The method of signal transmission and other specifications shall be clarified during the design phase.
    3. Electric heating connections for instrument cabinets and piping shall not be made using the same power supply line.
    4. The Designer shall prepare isometric heating drawings for piping, valves, and other relevant equipment.
    5. A warning label indicating electrically heated equipment shall be placed on the insulation of each heated device.
    6. Each electric heating line shall be terminated with an indicator light.
    7. Detailed technical requirement for equipment heating are provided in OL specifications OL-TR-ER-27 and OL-TR-ER-28.

### Designing power supply systems for motor operated valves and other electrical equipment.

* + 1. The Contractor shall design power supply for motor operated valves.
       1. The Design shall provide for dedicated commutation devices (e.g., Schneider Electric GV or equivalent) for both currently designed and future valves.
       2. New cable lines shall be designed for connecting the motor operated valves from the electrical cabinets to dedicated junction boxes with power disconnector SD-Esk-\*.
       3. Between SD-Esk-\*\* and Esk-\*\*, H07-RN-F type cables shall be designed, with sufficient slack (~2 meters) to allow for loop formation and mounting structures. All cables shall be routed through protective metal or plastic conduits.
    2. Connection of other equipment (e.g., cameras, fire protection systems, etc.) shall be coordinated separately with the OWNER.

### Designing earthing systems for the new equipment.

* + 1. The Design shall include provisions for the earthing of newly designed or replaced equipment, structures and other related components, along with potential equalization measures.
    2. A new earthing system shall be installed to serve the designed equipment.
    3. The new earthing system shall be connected to the existing earthing infrastructure.
    4. The flare structure shall be suitable for routing discharge to ground.
  1. If required, power supply for additional electrical equipment shall be coordinated with the leads of other disciplines and the OWNER during the design phase.

Where design solutions are expected to impact civil structures, the DESIGNER shall, during the design development phase, seek approval for such solutions from Mechanical Department Materials Engineering and Technical Analysis Group Manager.

## ATTACHMENTS:

* 1. List of Design Documentation (P\_4\_1.pdf).
  2. Electric cable line coding system (P\_4\_2.pdf).
  3. List of abbreviations to be used for design, modernization and operational control of electrical facilities. (P\_4\_3.pdf).
  4. Harmonized cable coding table. (P\_4\_4.pdf).
  5. List of manufacturers. (P\_4\_5.pdf).
  6. List of technical specifications. (P\_4\_6.pdf).
  7. Design registration card (P\_4\_7.pdf).
  8. TP-22 JVS-2 single-line diagram (P\_4\_8.pdf)
  9. TP-22 PS-2 single-line diagram (P\_4\_9.pdf).

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