**Technical specification for** **110kV voltage transformers**

The technical offer must be prepared according to the substation single-line diagram, which can be found in the substations design order or as a separate document.

In one project all instrument transformers must have the same type of insulation – either gas or oil!

1. **Technical requirements**

| **Description** | **Required** | **Offered** |
| --- | --- | --- |
| Type of design: gas or paper/oil insulated | yes/please specify |  |
| Measuring transformer hermetically sealed | yes |  |
| Quantity | According to substation single-line diagram |  |
| Transformation ratio (*Kr*) | According to substation single-line diagram |  |
| 1-st secondary measuring winding accuracy class |  |
| Rated output |  |
| 2-nd tertiary earth-fault winding accuracy class |  |
| Rated output |  |
| **Requirements for gas insulated instrument transformers** | **See below** |  |
| Insulation medium chemical composition | please specify |  |
| Insulation gas GWP≤1 | please specify GWP |  |
| Gas density monitor with two step signalling connected through self-closing valve | yes |  |
| Temperature-compensated gas density monitor with MPa/bar scale | yes |  |
| Gas leakage rate per year | ≤1% |  |
| Gas for the first filling included | yes |  |
| Pressure relief device (rupture disc) | yes |  |
| External thread for gas filling equipment connection | yes/please specify |  |
| **Requirements for paper/oil insulated instrument transformers** | **See below** |  |
| Insulation medium: Readily biodegradable oil | yes |  |
| Readily biodegradable oil type | please specify |  |
| Oil level indicator | yes |  |
| Leakproof design | yes |  |
| Tested by leak detection | yes |  |
| Stainless steel expansion bellows for oil | yes |  |
| Readily biodegradable oil according to IEC 60296 | yes |  |
| **Common requirements** | **See below** |  |
| Composite insulators with silicone sheds | yes |  |
| Highest voltage for equipment (*Um*) | ≥ 123 kV |  |
| Rated power frequency withstand voltage *(Ud)* | ≥ 230 kV |  |
| Rated lightning impulse withstand voltage *(Up)* | ≥ 550 kV |  |
| Insulation requirements of secondary terminals | ≥ 3 kV |  |
| Interturn insulation requirements | ≥ 4,5 kV |  |
| Rated frequency (*fr*) | 50 Hz |  |
| Creepage distance (based on Um/√3) | ≥ 43.3 mm / kV |  |
| Ambient air temperature range | -40°C up to +40°C |  |
| Intended for out-door installation | yes |  |
| Instrument transformers shall be designed, type tested and passed routine tests before delivery according to IEC 61869-1 and 61869-3 | yes |  |
| Rated voltage factor (continuous) | 1.2 Un |  |
| Rated voltage factor (30s) | 1.5 Un |  |
| Distance between hole centres of terminals | 45 × 45 mm |  |
| Static withstand load (*F*) | ≥ 1000N |  |
| Terminals for control, earthing and shield | yes |  |
| Feed – through secondary terminal blocks (e.g., Phoenix UT 10) | yes/please specify |  |
| All steel parts – hot-dip galvanised or of stainless steel | yes |  |
| Marking of all internal wiring should be made | yes |  |
| End of VT primary winding (terminal N) should be in terminal box | yes |  |
| Terminal box of non-corroding cast aluminium or stainless steel with air vent | yes |  |
| Secondary cable gland plate undrilled, at the bottom of terminal box | yes |  |
| Terminal box degree of protection (in accordance with IEC 60529) | ≥ IP-54 |  |
| Scheme plate on terminal box cover | yes |  |
| To the tender should be attached operating, maintenance and installation manuals in Latvian or English and preliminary drawing of offered equipment | yes |  |
| All nameplates in Latvian | yes |  |
| **Informative part:** | **See below** |  |
| Manufacturer | please specify |  |
| Type No. | please specify |  |
| Country of origin | please specify |  |
| Internal arc fault protection class (Class IA1 or Class IA2) | please specify |  |
| Gas nominal pressure at 20°C | MPa/bar |  |
| Quantity of gas or oil for 1 phase | kg |  |
| Approx. total weight of 1 phase-unit | kg |  |

**2. Spare parts, tools and services**

|  |  |  |
| --- | --- | --- |
| **Description:** | **Required:** | **Offered** |
| Gas pressure gauge with necessary O-rings for it exchange (only for gas insulatedinstrument transformers) | 1 unit |  |
| Oil sampling equipment (only for oil insulated instrument transformer) | 1 set |  |
| For each oil insulated instrument transformer oil DGA should be performed after instrument transformer routine test | yes |  |

1. **Technical documentation**

|  |  |  |
| --- | --- | --- |
| **Description:** | **Required:** | **Offered** |
| Operations, Maintenance and Installation manuals in Latvian and English in electronical PDF format. | Not later than two months before delivery of equipment |  |
| Preliminary drawings of instrument transformer in electronical PDF format:  Dimensional drawing  Rating plate drawing  Secondary terminal box drawing  Electrical diagram drawing | Within 60 days after signing of Contract |  |
| The corrected drawings of instrument transformer in electronical PDF format:  Dimensional drawing (also in .dwg format).  Rating plate drawing  Secondary terminal box drawing  Electrical diagram drawing | Within 14 days after Purchaser’s approval diagrams |  |
| Routine test reports in electronical PDF format | On time of instrument transformers delivery |  |
| Oil DGA test reports (only for oil insulated instrument transformers) in electronical PDF format |  |
| Technical data sheet in electronical PDF format |  |