Technical Questionnaire 9.102/1
Distribution Transformer Test System

Date:

1. Customer

Customer		
Country of installation		
Contact person at customer site	**Name**	
	Position	
	Tel.	
	Email	

2. General test requirement

	Should be part of offer		Remarks
	YES	**NO**	
Routine tests			
Measurement of insulation resistance			
Measurement of winding resistance			
Measurement of transformer ratio and vector group			
Measurement of no load losses and no load current			
Measurement of load losses and short circuit impedance			
Separate source voltage test			
▪ Specify maximum test voltage level on **HV-side**			
▪ Specify maximum test voltage level on **LV-side**			
Induced voltage test (ACSD)			
Induced voltage test (ACLD) with partial discharge measurement			
▪ PD measuring system is required?			
▪ Please specify required maximum PD-background-noise-level during test			
Type tests			
Temperature rise test			
▪ Temperature measurement system required? ▪ Please specify number of temperature sensors.			
▪ Automatic software analysis of heat run-tests?			
Lightning / switching impulse test (LI / SI) required?			
Special tests			
Acoustic measurement of noise level			
Zero-sequence test			
Other tests: please specify your requirements			

3. Additional Requirements Hardware and technical Consultancy

	Should be part of offer		Remarks
	YES	NO	
Routine tests			
Technical Consultancy (includes detailed planning of complete test field, cable routing, recommendation of building construction, development of safety system, earthing and grounding) required?			
Testing of dry-type / resin moulded transformers?			
Shielding of test field required?			
Testing of medium voltage coupling transformers? (nominal voltage of LV winding >1 kV)			
Testing of 16,7 Hz transformers? Please specify detailed Transformer data.			
Testing of inductors, Peterson Coils or other non-transformer- equipment?			
Feeding of multiple test fields (e.g. separate test fields for heat run / partial discharge or noise insulated rooms for noise level measurement)			
Outdoor installation of main power source or excessive air pollution (dust, sand, salt-fog, corrosive sulfur ect.)			
Independent visible disconnector- and earthing switch of the HV-test system required?			
Separate LED based illumination for test object area			
Bar code scanner (handheld device) for instant reading of serial number label			
Infrared (IR) temperature sensor for automatic measurement of tank temperature			

4. Additional requirements software

	Should be part of offer		Remarks
	YES	NO	
Routine tests			
Visualization of safety system and current status of testfield(s)			
Customized functions of control software ▪ Detailed specification will be necessary			
Integration of control system into existing software environment (ERP system)			
Other requirements (please specify)			

5. Set-up of automatic switch-over

A set of motor-driven high voltage switches can be installed for a remarkable reduction of manual operation needed to fulfill a complete routine test. Once the contacts on the high-voltage and low-voltage sides of the transformer under test are connected to the automated test system, all test circuit arrangements for routine tests will be set in fully automatic mode.

Including automatic switch-over?	❒ **yes**	❒ **no**
If **yes**, please specify your requirements for an optimal design for your application:		
Maximum level of separate source voltage on HV-side (phase-ground)	❒ ≤ 70 kV	❒ ≤ 100 kV
Maximum test current for separate source voltage test on HV-side	❒ ≤ 100mA	❒ ≤ 400 mA
Maximum voltage during induced voltage test on HV-side (phase-phase)	❒ ≤ 70 kV	❒ ≤ 100 kV
Maximum level of separate source voltage on LV-side (phase-ground)	❒ ≤ 3 kV	❒ ≤ 10 kV
Current rating of short circuit switch on LV-side (for load loss measuring)	❒ ≤3.6 kA	❒ ≤ 7.2 kA
Independent visible disconnector- and earthing switch of the HV-test system required?	❒ yes	❒ no

6. General transformer data

		Single-phase object		**Three-phase object**	
	unit	smallest object	largest object	smallest object	largest object
Rated power range	kVA				
Nominal HV- voltage range	kV				
Nominal LV- voltage range	kV				
Maximum load-losses	kW				
Maximum short-circuit impedance	%				
Rated frequency	Hz				
Maximum AC test voltage level:					
HV side: separate source voltage (phase-ground)	kV				
HV side: induced voltage (phase-phase)	kV				
LV side: separate source voltage (phase-ground)	kV				

7. Typical transformer data

Object number		1	2	3	4	5	6
Oil immersed or dry type transformer							
1 or 3 phase							
Rated power (kVA)							
Rated frequency (Hz)							
Rated voltage HV (kV)							
Rated voltage LV (kV)							
Rated voltage TV (kV), if available							
Vector group							
Short circuit voltage Uk (%) (HV-LV)							
Load losses (kW)							
No-load losses at 100% of rated voltage (kW)							
No-load current at 100% of test voltage (%)							
No-load current at 110% of test voltage (%)							
AC test voltage separate source test (kV phase-ground) for HV / LV							
AC test voltage (kV phase-phase) for induced voltage test							
Windings capacitance (nF)	HV						
	LV						
	HV-LV						
Through put: transformers per week							

Please provide a selection of test reports and data sheets of planned test objects.

8. General information about the test field

Layout (L x W x H), if application for test shop*[1]	**Test field**	**m x m x m**	
Ambient conditions	Altitude above sea level	m	
	Min. ambient temperature	°C	
	Max. ambient temperature	°C	
	Relative humidity	%	

*[1)] a drawing about the layout of the test field is favored