

SCOPE OF WORK

2500 KVA OIL TYPE TRANSFORMER REPLACEMENT

A. Scope of work

This specification describes the requirements with which the manufacturer shall comply in order to supply and install pad-mounted compartmental type transformers to the Embassy of United State of America Bangkok Thailand. The transformer shall be rated for 2500KVA, 24KV primary and 416/240 for secondary, 3 phase, 50 Hz distribution system having the neutral solidly grounded at the distribution substations, where the fault level of the outgoing feeders is 15 kA. The work under this scope shall include installation of a full height draw out type power circuit-breakers at the outgoing section

B. Site and Service Conditions

The new transformer shall be installed in the US embassy Bangkok Thailand located on 120-122 Wireless road, Lumpini, Pratumwan, Bangkok. The transformers shall be suitable for use in climatic area and shall be capable of operating at ratings in the service conditions mentioned above.

C. Reference Standard

Except otherwise specified elsewhere in the specification, all equipment required by COR shall be manufactured and tested in conformity with the latest revision of the standards such as IEC 76 and ANSI C 57

D. Manufacturer qualification

The manufacturer shall have previously supplied to customers in tropical countries having similar climate to Thailand and outside the country of origin which has operated satisfactorily in service for a minimum of 3 (three) years of 3000 MVA except the manufacturer who used to supply this type of transformers to COR and they are satisfactorily in service.

The manufacturer of the proposed transformer shall have satisfactory experienced to have short circuit tested to IEC 76-5 on his transformer. The test shall be done by members of Short Circuit Testing Liaison or other international acknowledge and reputable station subjected to COR approval.

E. Test, Inspection and Test Report

Standard factory tests shall be made in accordance with routine tests stated in the reference standard and they shall be performed in accordance with the procedure specified

The factory test report shall be sent before or together with the transformer's delivery. Prior to the shipment, the supplier shall submit to COR the complete and certified reports of all tests made in 3 copies. The test reports shall contain all data required for their complete understanding such as; diagrams, methods, instruments, constants and values used in the tests and the results obtained. If COR has his own inspector, the supplier shall submit all the above test reports to the inspector and the inspector himself shall certify the witnessed test report and review the remainder before submitting to COR.

F. Ratings and Features

The transformers shall have the following ratings and features.

Type	Pad-mounted compartmental type, three phase, liquid cooled
Frequency	50 Hz
kVA ratings	2500 Kva.
Winding	Copper
High-voltage rating	24 kV, delta connection
Low-voltage rating	416Y/240 V
Vector group	Dyn 11
No load primary taps	Two 2.5% taps above neutral position, and two 2.5% taps below neutral position.
Impedance voltage	As measured on the rated voltage connection, shall be not less than 6.5% at rated kVA without any tolerance for 2500 kVA and above.
Avg Temperature rise	55 C
Accessories	Liquid sample drain, Drain valve, Liquid temperature gauge, Vacuum/pressure gauge, Liquid level gauge, Pressure relief device, Lightning arrestors.
Basic Impulse level	Minimum 125KV BIL V HV winding.
Losses	3200 W for no load and 26800 W with load at 75C

G. General Requirements

- G1 Transformers shall be oil-immersed, self-cooled, sealed tank type, bolted on main cover construction.
- G2 Each unit shall consist of a transformer section with a high-voltage compartment and a low-voltage compartment both assembled as integral parts of the unit. The design shall be of tamperproof, weatherproof and suitable for mounting on any supporting pad.
- G3 The high-voltage and low-voltage compartment doors shall be so arranged and mechanically interlocked that access to the high-voltage compartment can be gained only after opening the low-voltage compartment door and suitable means for pad-locking the low-voltage compartment door shall be provided.
- G4 All doors shall be equipped for latching in the open position, all hinges and pins shall be stainless steel.
- G5 The low-voltage neutral shall be fully insulated bushing.
- G6 The low-voltage terminals shall be copper and shall permit overloads as indicated in the relevant ANSI standard without a reduction of the transformer minimum life expectancy.

H. Insulating Oil

Transformer oil shall be well filtered and the dielectric strength before filling in transformer tank is not less than 30 kV as tested by the method, specified by ASTM 0877 or equal. The dielectric strength of a sample of insulating oil

taken from a new transformer shall not be less than 26 kV, when measured in accordance with ANSI Standard Method of Testing Electrical Insulating Oils C59.2-1966 or equal.

I. High Voltage Compartment

The high voltage compartment shall be arranged for dead front construction, cabling from below and radial feed application. The following equipment shall be furnished as a minimum: -

- a) 3- Universal bushing wells 200 A 25 kV arranged intertie for loop-feed. The phase designations H1, H2, H3 shall be identified by stencil marking on the tank wall.
- b) 3- Non load break type bushing well inserts 200 A 25 kV and 10 kA symmetrical momentary rating threaded into the bushing well.
- c) 3- Non load break type elbows 200 A 25 kV and symmetrical momentary rating suitable for terminating 12/20kV, 70 mm single core copper cable, crosslinked polyethylene insulated, copper wire screen and jacketed.
- d) 3- Bell clamp assembly for elbow connectors.
- e) 3- Stand-off insulators fully insulated for parking the disconnected and energized non-loadbreak elbows connector. They shall be fixed securely in place at the parking stands.
- f) 3-Bayonet type fuses complete with proper rated fuse links submerged in the transformer oil.

J. Core

J1 The core shall be made of high quality, non-aging, grain-oriented, low loss, high permeability silicon steel strips which have smooth surfaces at the edges and are properly annealed after cutting. Each sheet of the core shall be insulated on both sides with a durable, heat-resistant material.

J2 The core shall be rigidly clamped with positive locking devices and an adequate number of core bandages shall be applied to ensure uniform compression of the limbs. The design shall have ample mechanical strength to prevent shifting of steel laminations during transport and to reduce the vibration to a minimum during operation.

J3 The core and coil assembly shall be rigidly held in the tank. The assembly shall not shift in any direction even when subject to shock and rough handling during transportation and installation.

K. Winding

K1 Transformer winding shall be COPPER.

K2 Transformer winding shall be designed and manufactured in order to resist, without suffering damage, the thermal and mechanical effects caused by external short circuits.

L. Accessory Equipment

The transformer shall be provided with all accessory equipment as specified in ANSI c.57.12.26-1975.

- a) Pressure relief device: The pressure relief device shall be provided to relieve pressure in excess of pressure resulting from normal operation, which builds up slowly owing to overloads, high ambient temperature, external secondary faults, and internal incipient faults in the low voltage winding with emission of only a negligible amount of oil.

- b) 1 inch drain valve with built-in sampling device.
- c) Lightning arrestors.
- d) Magnetic liquid level gauge.
- e) Dial type thermometer: The thermometer shall be equipped with a maximum pointer which can be reset from outside.
- f) The unit finishing shall be outdoor light grey ASA No. 70 or equal. The entire metal surface area shall be chemically cleaned before painting to remove any dirt, oil or other impurities from the forming and welding operations. Painting shall be given after one or more coats of rust inhibitor primer, with two finish coats.

M. Low voltage outgoing CB

Outgoing section: Each outgoing section shall be a full height 4000 amps-draw out type power circuit-breaker, same as main circuit-breaker at the switchboard with bus stubs arranged for connection to the distribution cable duct. The circuit breaker shall have the same trip functions of the main circuit breaker and 65K AIC minimum. The circuit breaker shall be separated by barrier preventing hot air from being circulated over the breaker sections

QUANTITY: 2 sets, for this new transformer(M2) and for the other existing transformer (M1)

N Additional Requirements for Marking and Packing

The transformers shall be shipped oil-filled, individually packed on pallet with suitable fasteners.

O. Warranty Requirement

If transformer is damaged within the 3 year guaranteed period, the manufacturer shall promptly investigate, repair or replace it if the damage is caused by the defect of the equipment itself or by the defect of contractor