

## SECTION 3C - ELECTRICAL EQUIPMENT

### 3C.1 230 kV GIS Combined Cycle Block Switchyard

#### 3C.1.1 General

This section covers the requirement for the 230kV GIS combined cycle block switchyard to complete the Plant operation. The 230kV GIS combined cycle block switchyard shall interconnect the generator transformers to EGAT 230kV GIS substation via EGAT 230kV cable. The interconnection between generator transformer and 230kV GIS shall be done by 230kV underground cable and outdoor cable termination. The details of 230kV underground cable and outdoor cable termination shall be described in section 3C.25.

The general technical requirements for the design, manufacture, testing at works, supply, supervision of erection and testing at site of the SF<sub>6</sub> gas insulated switchgear are specified in this section.

Specific ratings, characteristics, features and performance characteristics of 230kV GIS are shown on the accompanying Ratings and Features sheets.

For indoor GIS the building will be equipped with an overhead crane suitable for lifting the heaviest part for installation unless otherwise specified.

The manufacturers shall have supplied record of equipment of the type and rating proposed with successful operation/use for at least three (3) consecutive years in overseas country (not his own country) and at least three (3) substations of with total GIS bays shall not be less than twenty (20). The rating and features of each bay shall be the same or similar rating as EGAT specifies.

Reference record of either the parent or affiliated companies shall not be considered as the record of such manufacturer.

#### 3C.1.2 Material, Workmanship and Design

All materials used in the manufacture of the specified equipment shall be unused, of recent manufacture and of the kind, composition and physical properties be suited to their various purposes and in accordance with the best engineering practices.

Workmanship shall be of the highest grade and conform to the best modern practice for the manufacture of high grade machinery and electrical equipment.

All work shall be performed by mechanics and electricians skilled in their various trades.

The factory welders shall be qualified personnel. Materials and process specifications needed for welding shall meet the applicable requirements. Field welding of the switchgear is to be avoided to achieve high quality of welding.

Maximum reliability is to be achieved by a minimum amount of erection on site. Subassemblies are to be erected and tested in the factory to a maximum extent. The size of the sub-assemblies should only be limited by the transport conditions.

Subject to the desire and decision of EGAT, the Contractor may be required to furnish the services of qualified and experienced supervisor(s).

The scope of responsibility of the supervisor on behalf of the Contractor is as follows:

- Supervise and be responsible for the installation, erection, adjustment, field test and commissioning of the equipment.
- Prepare formulation sheets for a check list, test sheet, release form and field report to be discussed with EGAT before performing the installation work.

- Submit report summarizing the work performance, from the beginning to the completion of the supervisory period.

## The supervisor shall, in each and every instance, cooperate fully with the 230kV cable and cable termination's personnel/Contractor ~~both plant-side and transmission line-side~~ installing, testing including cable plug in and plug off and/or operating the equipment and the work. The operations of the supervisor shall be coordinated with the program of construction at the site. Notwithstanding, the program to tie-in the 230kV cable for transmission line bay of the equipment shall be advised by EGAT.

The modular design of the switchgear shall offer maximum flexibility from the point of view of design, operation, maintenance and possible repairs. Similar modules are to be easily interchangeable.

The enclosure must be designed as pressure vessels for the highest pressure that can occur during service.

The enclosure shall be of metal, permanently grounded and capable of withstanding the nominal and transient pressure to which it is subjected in service. Materials used in the construction of enclosures shall be of known and certified minimum physical properties on which calculations and/or proof test are based. The manufacturer shall be responsible for the selection of materials and the maintenance of these minimum properties, based on certification of the material supplier, or test conducted by the manufacturer.

All joints shall be machined and all castings shall be spot faced for bolt heads, nuts and washers. All screws, bolts, studs and nuts shall be metric system.

Assemblies shall have reliable provisions to absorb thermal expansion and contraction caused by temperature cycling and to allow compensation for the tolerances during manufacture, metal bellow-type compensator are preferred. They shall be provided with adjustable tensioners.

The design of all components, particularly those subject to shock or stress reversal, shall incorporate reasonable factor of safety in all cases.

For supervision of the gas the following shall be provided:

- Pressure gauge shall be installed for each circuit breaker compartment.
- The densimeter (gas density switch) with two pressure level contacts shall be installed for each phase compartment. A separate densimeter shall be provided for each gas compartment, so that each can be monitored simultaneously.

If circuit breaker compartment is operated with a rated SF6 pressure higher than in adjacent compartment, a third contact for indicating over pressure shall be provided.

The gas density switch shall give an alarm in the first step and the third step (if any) for each gas compartment and the second step lock out or automatically trip for the circuit breaker.

The gas compartment shall be provided separable gas section for density switch testing.

- Connecting means shall be provided for connecting of pressure gauge to measure the SF6 pressure of each compartment.
- Three (3) loose pressure gauges completed with necessary fitting suitable for connecting to the connecting means mentioned above shall be provided.

The manufacturer shall guarantee that the pressure loss within each individual gas compartment will not be more than 0.5% per year.