

# **TECHNICAL SPECIFICATION FOR SF6 GAS WITH CYLINDERS.**

**1. TECHNICAL SPECIFICATION**

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## TECHNICAL SPECIFICATION

### **1.SCOPE**

This specification covers the supply and delivery of new, unused, i.e. before introduction into any electrical equipment, SF6 Gas in cylinders for use in the SF6 type circuit breakers installed at Grid Sub-stations located all over the state of Orissa under Orissa Power Transmission Corporation Ltd.

### **2.APPLICABLE STANDARDS:**

IS: 13072 Sulphur Hexafluoride for electrical purposes.

IS: 4379 Identification of contents of industrial gas cylinders.

IS: 7311 Seamless high carbon steel cylinders for permanent and high pressure liquefiable gases.

### **3.DEVIATIONS**

Materials meeting with the requirements of any other authoritative standards, which ensures equal or better quality than the standards mentioned above, shall also be acceptable, if the bidder clearly identifies the salient point of differences and merits between the standards adopted and the standards indicated above. Two copies of such standards with authentic English translations shall be furnished along with the offer. The Purchaser, however, reserves the right to accept or reject the above standards at its discretion, without assigning any reason thereof.

### **4.TOPOGRAPHICAL AND METEOROLOGICAL SITE CONDITIONS.**

Location of installations.	State of Orissa.
Altitude.	1000 m
Maximum Temperature.	55°C
Minimum Temperature.	0°C
Maximum daily average temperature.	32°C
Maximum humidity.	100%
Pollution level.	Heavy.
Airborne contamination, if any.	Highly polluted
Seismic withstand factor.	0.3g
Maximum wind pressure.	200 Kg/m <sup>2</sup>
Wind velocity.	50 m/sec.
Maximum rainfall per annum	2000 mm
Average rainfall per annum	1500 mm
Average no. of thunder-storm days per annum	70
Average no. of dust storm days per annum.	20

## 5.GENERAL REQUIREMENT

- a)The SF6 Gas cylinders shall be supplied with an universal type of valve outlet for filling gas in different makes of circuit breakers. The circuit breaker manufacturers shall provide necessary valve, connections and fixtures for the circuit breaker end. Complete compatibility shall be ensured for filling up of gas in any make of circuit breaker, currently under use.
- b)The SF6 gas shall be free from impurities and toxic contents as per the relevant IS specifications. There should not be any contamination or introduction of impurities from defective manufacturing process, leakage in manufacturing plant or contaminations from containing cylinders.
- c)The SF6 gas shall be filled in appropriate container of specified capacity in liquid state. The cylinders shall be marked as per the relevant IS for the identification of contents. There shall not be any leakage of gas during transportation and storage.
- d)Marking of Cylinders:-  
“Each Cylinder should be legibly marked at the valve end and preferably off the cylindrical part of the body with:
- i.The symbol of SF6
  - ii.“Sulphur Hexaflouride” in words, and the name of the country of origin.
  - iii.The tare weight of the cylinder without protective cap.
  - iv.Additional markings, colourings etc. may be added in accordance with national or manufacturer’s practice. The above marking is the basic necessity as per IS.
- e)The supplier, if not, manufacturer, shall furnish a letter of authority from the manufacturer to sell their product in India, at the time of submission of their bid. Also the supplier/manufacturer shall furnish the letter of authority from the Dept. of Explosive Govt. of India or from Govt. bodies for handling these materials, without any difficulty and the letter to be attached with their bid.
- f)Only manufacturer’s SF6 gas cylinder with gas & seal will be acceptable by OPTCL.**
- g)If manufacturer’s SF6 gas cylinders to hold 50 kgs of SF6gas will not be available ,then manufacturer’s transportable cylinder size & weight of the SF6 gas in it shall be quoted. The cylinder size should be very near to 50 kg SF6 gas cylinder size, for it’s easy handling during transportation & field uses.**

## **6.INSPECTION AND TESTING:**

The manufacturer/supplier shall furnish all the test results, method of test details as specified in IS: 13072/ IEC 376 with latest amendments if any, from any Govt. approved laboratory with competence along with their offer. Also they shall furnish the informations on details of the tests to be carried out at the manufacturer/ authorized dealer's factory during inspection & testing of the SF6 gases , in order to establish the purity of the SF6 gas , permissible limits of impurities in the gas , to establish cylinder weight , weight of the gases in the cylinders & etc. Identically, the cylinders shall also be type tested as per the relevant IS and such type tests reports shall be furnished alongwith the offer. The supplier shall make necessary arrangements for conducting tests , to the satisfaction of the Inspection Officer at free of cost.

## **7.MANUALS AND LITERATURES**

The supplier shall furnish at least six sets of instruction manuals/ literatures/ drawings etc. containing instructions and guidelines for proper safety, storage, handling, filling and any other use of the gas. The details of valve outlets and their compatibility shall be described in detail for the benefit of use at site.

## **8.TRAINING:**

The supplier may be required to impart training on the handling of use of the gas at Bhubaneswar or at the site of use. In such circumstance, the supplier shall conduct such training at the desired place as will be instructed by the purchaser at free of cost.

GUARANTEED TECHNICAL PARTICULARS OF SF<sub>6</sub> GAS WITH CYLINDERS.

Sl. No.	Description.	Unit.	Purchaser's requirement.	Manufacturer's data.
1.	Manufacturer's name.		To be stated.	
2.	Country of manufacturer.		To be stated.	
3.	Manufacturer's designation of the equipment.		To be stated.	
4.	a. Size of Cylinder.	In kg.	50 kg or nearer to it.	
	b. Max. Filling ratio.	Kg/l	As per IS:13072	
	c. Test pressure.	Bar	70	
	d. Materials of Cylinder.		To be stated.	
	e. Type of Cylinder.		Seamless.	
	f. Gross weight & Net weight of Cylinder.			
5.	Marking of Cylinders.		As per IS: 13072	
6.	Physical property of SF <sub>6</sub> Gas.			
	a. Colour		Colourless.	
	b. Odour.		Odourless.	
	c. Toxicity.		Non-toxic.	
	d. State at room temp. and pressure.		Gaseous.	
	e. Density at 20°C.	Gm/ltr.	6.16	
	f. critical Temperature.	OC	45.6	
	g. Saturated vapour pressure.	Bars	To be furnished.	
	h. Condensation temperature.	OC	-42	
	i. Solvent solubility		Soluble in transformer oil	
	j. Reactivity.		Should be stable at normal temp. and pressure.	
	k. Polymerization.		Should not polymerize.	
7.	Electrical property of SF <sub>6</sub> Gas.		Electro-negative with arc quenching property, high electrical strength about 2 ½ times of N <sub>2</sub>	

8. Max. Permissible limits of impurities:
- |  |     |  |
|--|-----|--|
| a. CF <sub>4</sub>                         | %   | 0.05   |
| b. O <sub>2</sub> + N <sub>2</sub> air     | %   | 0.05   |
| c. Water                                   | ppm | 15   |
| d. Acidity expressed as HF                 | ppm | 0.3  |
| e. Hydrolysable Flourides, expressed as HF | ppm | 1.0  |
| f. Oil content.                            |     | SF <sub>6</sub> Substantially free from oil. |
9. Evaporation rate of SF<sub>6</sub> in the container. To be stated.
10. Hazard identification as per NFPA Ratings in a scale of 0-4:
- |    |             |   |
|----|-------------|---|
| a. | Health.     | 1 |
| b. | Fire        | 0 |
| c. | Reactivity. | 0 |
11. Certification regarding meeting requirement as per Section FIVE, clause-15 of IS: 13072 To be furnished.
12. Purity of the SF<sub>6</sub> Gas. More than 99.99% by weight. (This has to be confirmed by the bidder/supplier). Procedure/method of such testing to be indicated.

## SCHEDULE-1

### **SCHEDULE OF REQUIREMENT AND DESIRED DELIVERY**

#### **PHASE-1**

Sl. No.	Description.	Quantity Required.	Desired delivery.	Destination.
1.	SF <sub>6</sub> Gas with Cylinder.  (Each cylinder containing 50 kg. of SF <sub>6</sub> Gas)Only manufacturer's cylinders are acceptable.	750 kgs  (15 nos.cylinders)	Within 3(Three) months from the date of placement of the Purchase Order.	Any stores of O.P.T.C.L. located within the state of Orissa. The exact destinations will be indicated at the time of issue of despatch instruction

The detail delivery programme and quantity to be delivered will be intimated at the time of placement of the purchase order.

#### **PHASE-II**

Sl. No.	Description.	Quantity Required.	Desired delivery.	Destination.
1.	SF <sub>6</sub> Gas with Cylinder.  (Each cylinder containing 50 kg. of SF <sub>6</sub> Gas)Only manufacturer's cylinders are acceptable.	1900kgs  (38 nos.cylinders)	Within 3(Three) months from the Dated 01.04.15	Any stores of O.P.T.C.L. located within the state of Orissa. The exact destinations will be indicated at the time of issue of despatch instruction.

The detail delivery programme and quantity to be delivered will be intimated at the time of placement of the purchase order.