a.	Type	Power Transformer, 3 Phases, Core Type, Outdoor, Oil Immersed	
b.	Cooling Class	ONAN or ONAN / ONAF / ONAF	
c.	Rated Frequency	50	Hz
d.	Rated Capacity		
	-HV Side	50 or 30 / 40 / 50	MVA
	-LV Side	50 or 30 / 40 / 50	MVA
	-TV Side	16.7 or 10 / 13.3 / 16.7	MVA
e.	Rated Voltage		
	-HV Side	115	kV
	-LV Side	23	kV
	-TV Side	11	kV
f.	Nominal System Voltage		
	-HV Side	115	kV
	-LV Side	22	kV
	-TV Side	11	kV
g.	Max. Continuous System Voltage		
	-HV Side	121	kV
	-LV Side	24	kV
	-TV Side	12	kV
h.	Insulation Level (BIL) of Winding		
	-HV Side	550	kV
	-LV Side	150	kV
	-TV Side	110	kV
	-Neutral	150	kV
i.	Insulation Level (BIL) of Bushing		
	-HV Side	550	kV
	-LV Side	150	kV
	-TV Side	110	kV
	-Neutral	150	kV
j.	Creepage Distance of Bushing		
	-HV Side	≥3025	mm
	-LV Side	≥ 600	mm
	-TV Side	≥ 300	mm
	-Neutral	≥ 600	mm
k.	Connection of Windings in Three Phases		
	-HV Side	Ground Wye	
	-LV Side	Ground Wye	
	-TV Side	Delta	

l. Voltage Vector Group of Winding
- -HV Side and LV Side: Yy0
- -LV Side and TV Side: Yd1
- -HV Side and TV Side: Yd1

m. Positive Sequence Impedance at Rated Voltage (Single Phase MVA Base)
- - HV Side to LV Side: 12.5% (50 MVA Base)
- - LV Side to TV Side: -
- - HV Side to TV Side: -

n. Off Load Tap Changer: -

o. On Load Tap Changer
- - Tapping Range Base on Rated Voltage: +10.5%, -15% on HV Side with 1.5% Step

p. Temperature Class of Winding Insulation: 120

q. Winding Temperature Rise when Carrying Max. Continuous Rated Capacity
- - Winding Average: ≤ 60 °C
- - Winding Hottest Spot: ≤ 75 °C
- - Top Oil: ≤ 60 °C

r. Average Audible Sound Pressure Level at Rated Voltage and Frequency
- - Without Fan: ≤ 66 dB(A)
- - With Fan: ≤ 68 dB(A)

s. Surge Arrester, Station Class, Tank Mounted; Complete with Discharge Counter

HV Side (see detail in RF SA7Y11)
- - Qty. per Phase: 1
- - Voltage Rating: 108 kV

LV Side (see detail in RF SA2Y11)
- - Qty. per Phase: 1
- - Voltage Rating: 21 kV

TV Side (see detail in RF -)
- - Qty. per Phase: -
- - Voltage Rating: - kV

t. Parallel Operation Requirement (between HV and LV side)

[ ] Not Required

[x] With Future Transformer or Each Other in the same Substation

[ ] With Existing Transformer in accordance with Dwg. No. _____ attached

u. Bushing Current Transformer

HV Side
- - Qty. per Phase: 1
- - Accuracy Class: C400
- - Ratio: 50/100/150/200/250/300/350/400 : 5 A
- - Thermal Current Rating Factor: 1.0

LV Side
- - Qty. per Phase: 1
- - Accuracy Class: C400
- - Ratio: 300/400/500/800/1100/1200/1500/1600/2000 : 5 A
- - Thermal Current Rating Factor: 1.0

TV Side
- Qty. per Phase (On Y1) -
- Accuracy Class -
- Ratio -
- Thermal Current Rating Factor -

v. Applicable Standards IEEE Std. C57.12

Note :
1. One tertiary bushing shall be brought out for grounding purpose.
2. The positive sequence impedance from HV side to LV side shall have a tolerance of ±5% of specified value.
3. The HV-TV and LV-TV impedance of the transformer shall be designed to limit the fault current in the tertiary winding occurred during a single line to ground fault on the HV and/or LV side to a suitable value that the transformer can withstand such fault. Calculation showing such fault limitation shall be included in Bidding.
4. The transformer shall be designed to withstand the following fault occurrence rates with the expected transformer life of 25 years.

Current Intensity	Times/Year
100 %	1
50 %	20
20 %	100

Where the 100 % current intensity means the maximum value of the short circuit current.

5. The transformer shall be suitable for energization from either the high or low voltage sides (step-down and step-up operation).
6. The total loss of the transformer is less than 200 kW at rated capacity.

Ratings and Features	**Designed :**	**Validated :**	**Revision 0**	**Page 1/3**
RF No. TX7416	**Verified :**	**Approved :**	**Dated :** 26/3/21	

a.	Type	Power Transformer, 3 Phases, Core Type, Outdoor, Oil Immersed	
b.	Cooling Class	ONAN or ONAN/ONAF/ONAF	
c.	Rated Frequency	50	Hz
d.	Rated Capacity		
	- HV	50 or 30/ 40/ 50	MVA
	- LV	50 or 30/ 40/ 50	MVA
	- TV	-	MVA
e.	Rated Voltage		
	- HV Side	115	kV
	- LV Side	23	kV
	- TV Side	-	kV
f.	Nominal System Voltage		
	- HV Side	115	kV
	- LV Side	22	kV
	- TV Side	-	kV
g.	Max. Continuous System Voltage		
	- HV Side	121	kV
	- LV Side	24	kV
	- TV Side	-	kV
h.	Insulation Level (BIL) of Winding		
	- HV Side	550	kV
	- LV Side	150	kV
	- TV Side	-	kV
	- Neutral	150	kV
i.	Insulation Level (BIL) of Bushing		
	- HV Side	550	kV
	- LV Side	150	kV
	- TV Side	-	kV
	- Neutral	150	kV
j.	Creepage Distance of Bushing		
	- HV Side	≥ 3025	mm
	- LV Side	≥ 600	mm
	- TV Side	≥ -	mm
	- Neutral	≥ 600	mm
k.	Connection of Windings in Three Phases	Dyn1	
l.	Positive Sequence Impedance at Rated Voltage (Single Phase MVA Base)		
	- HV Side to LV Side	12.5 %	(50 MVA Base)
	- LV Side to TV Side	-	(MVA Base)
	- HV Side to TV Side	-	(MVA Base)
m.	Off Load Tap Changer	-	
n.	On Load Tap Changer		
	- Tapping Range Base on Rated Voltage	+10.5 %, -15% on HV Side with 1.5% Step	
o.	Temperature Class of Winding Insulation	120	

p.	Winding Temperature Rise when Carrying Max. Continuous Rated Capacity		
	- Winding Average	≤ 60	°C
	- Winding Hottest Spot	≤ 75	°C
	- Top Oil	≤ 60	°C
q.	Average Audible Sound Pressure Level at Rated Voltage and Frequency		
	- Without Fan	≤ 66	dB(A)
	- With Fan	≤ 68	dB(A)
r.	Surge Arrester, Station Class, Tank Mounted; Complete with Discharge Counter		
	HV Side (see detail in RF SA7D11)		
	- Qty. per Phase	1	
	- Voltage Rating	120	kV
	LV Side (see detail in RF SA2Y11)		
	- Qty. per Phase	1	
	- Voltage Rating	21	kV
	TV Side (see detail in RF -)		
	- Qty. per Phase	-	
	- Voltage Rating	-	kV
s.	Parallel Operation Requirement (between HV and LV side)	[ ] Not Required [X] With Future Transformer or Each Other in the same Substation [ ] With Existing Transformer in accordance with Dwg. No. _____ attached	
t.	Bushing Current Transformer		
	HV Side - Qty. per Phase	1	
	- Accuracy Class	C400	
	- Ratio	50/100/150/200/250/300/350/400 : 5 A	
	- Thermal Current Rating Factor	1.0	
	LV Side - Qty. per Phase	1	
	- Accuracy Class	C400	
	- Ratio	300/400/500/800/1100/1200/1500/1600/2000: 5 A	
	- Thermal Current Rating Factor	1.0	
	TV Side - Qty. per Phase (On Y1)	-	
	- Accuracy Class	-	
	- Ratio	-	
	- Thermal Current Rating Factor	-	
u.	Applicable Standards	IEEE Std. C57.12	

Note : 1. The positive sequence impedance from HV side to LV side shall have a tolerance of ±5% of specified value.

2. The transformer shall be designed to withstand the following fault occurrence rates with the expected transformer life of 25 years.

Current Intensity	Times/Year
100 %	1
50 %	20
20 %	100

Where the 100 % current intensity means the maximum value of the short circuit current.

3. The transformer shall be suitable for energization from either the high or low voltage sides (step-down and step-up operation).

4. The total loss of the transformer is less than 200 kW at rated capacity.