

Client:  Petro Kavian Sanat Pars Co.	EXTENSION TO NEYRIZ 66/20 KV SUBSTATION		Consultant:  شرکت مهندسی مشاور انجی
	Document Title: Guarantee Table For Cable System		
	Document Number: NRZ-ANJ-SS-GUT-142	Rev: Z	Page 1 of 17

EXTENSION TO NEYRIZ 66/20KVSUBSTATION

GUARANTEE TABLE FOR CABLE SYSTEM

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Rev.	Purpose of Issue	Date	Prepared	Check	Approved	Authorized

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1 INTRODUCTION

1.1 Purpose

This document has been prepared to specify and establish the minimum technical requirements for the design, supply, installation, and commissioning of the Extension to Neyriz 66/20 kV Substation.

1.2 Definitions

Within the context of this document, the following definitions will be applicable:

Project:	Extension to Neyriz 66/20 kV Substation
Client:	Petro Kavian Sanat Pars Co.
Owner:	Fars Regional Electric Co.
Consultants:	Aria Niroo Jam Co.
EPC Contractor:	Any firm who is responsible for providing any service and material with respect to detailed engineering, procurement, construction of all items and material in accordance with the contract between the CLIENT and him.
Vendor/Supplier:	The company, which has been selected to supply the equipment and material and products technical documentation mainly, related to the production of the ordered supply.

The word "shall" indicate a requirement. The word "should" indicate a recommendation.

Contractor shall be responsible for vendor goods.

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2 HIGH VOLTAGE POWER CABLE

ITEM	DESCRIPTION	UNIT	TECHNICAL PARTICULARS
1	Manufacturer's name and country		
2	Manufacturer's type and identification		
3	Voltage rating	kV	
4	Number of cores		
5	Max. permissible continuous current carrying capacity under "as laid" condition:	A	
5.1	Ground temperature 45 °C		
5.2	Depth of laying 70Cm		
5.3	Thermal resistivity of ground 1 °C	m/W	
5.4	Spacing between cables, flat formation,	7cm	
5.5	Continuous operation (load factor=1)		
6	Conductor details:		
6.1	Sectional area of conductor(s)	mm ²	
6.2	Material		
6.3	Whether circular or shaped		
6.4	Number and size of wires	No./mm	
6.5	Semi-conducting sheath material		
7	Nominal radial thickness of insulation:		
7.1	Between conductors	mm	
7.2	Between conductor and/or screen	mm	

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ITEM	DESCRIPTION	UNIT	TECHNICAL PARTICULARS
8	Type of insulation-i.e.: Mass impregnated Mass non-draining pre-impregnated XLPE		
9	Metal screen:		
9.1	Material		
9.2	Minimum thickness at any point	mm	
9.3	For aluminum sheaths only		
a)	Depth of corrugations	mm	
b)	Pitch of corrugations	mm	
10	Nominal diameter over metal screen	mm	
11	Composition of lead (alloy) sheath:		
11.1	Tin	%	
11.2	Cadmium	%	
11.3	Antimony	%	
11.4	lead	%	
12	Composition of Aluminum sheath:		
12.1	Grade of Aluminum		
12.2	Method of application		
13	Bedding for armour (inner plastic sheath):		
13.1	Material		
13.2	Nominal thickness	mm	
14	Armour:		
14.1	Material (galvanized steel, aluminum,...)		

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ITEM	DESCRIPTION	UNIT	TECHNICAL PARTICULARS
14.2	Double tape armour	mm	
a)	Thickness of tapes	mm	
b)	Width of tapes	mm	
c)	Maximum gap between conductors	mm	
14.3	Single wire armour		
a)	Number pf wires in first layer		
b)	Thickness of wires	mm	
14.4	Double wire armour		
a)	Number of wires in first layer		
b)	Number of wires in second layer		
c)	Diameter of wires	mm	
15	Outer covering:		
15.1	Material		
15.2	For Fibrous servings only Nominal thickness	mm	
15.3	For extruded servings only		
a)	Min. thickness	mm	
b)	Nom. and max. thickness	mm	
16	Nominal overall diameter of completed cable	mm	
17	Nominal weight of one meter of completed cable	kg	
18	Minimum radius of bend round which cable can be laid:		

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ITEM	DESCRIPTION	UNIT	TECHNICAL PARTICULARS
18.1	In ground or air	m	
18.2	In ducts		
18.3	Adjacent to terminations with former	m	
19	Minimum radius of bend for individual cores at joints and terminations	m	
20	Nominal internal diameter of pipes or ducts	mm	
21	Maximum D.C. resistance of conductor for 1,000 meters of cable at 20 °C	Ω	
22	Equivalent star reactance per 1000 meters of the three phase circuit at rated frequency	Ω	
23	Maximum electrostatic capacitance		
23.1	Between one core and the remainder bunched and connected to metal sheath		
23.2	Between one core and screen		
23.3	Between all cores (bunched) and sheath		
24	Maximum permissible continuous current rating of cable at 50°C ambient temperature, continuous operation and 7 cm spacing between cables under laid conditions as follows:		
24.1	In concrete cable trench	A	
24.2	In air	A	
24.3	In cable duct or pipe	A	
25	Maximum conductor temperature corresponding to items 5 & 24 above °C		
a)	Normal permanent load		

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ITEM	DESCRIPTION	UNIT	TECHNICAL PARTICULARS
b)	Emergency load max. during 8h/day and 100h/annual		
c)	Short circuit		
26	Maximum permissible short circuit rating of three second duration assuming short circuit occurs when cable is at its maximum operating temperature:		
26.1	Conductor	KA	
26.2	Screen	KA	
27	Maximum temperature attained by conductor and metal sheath under the short circuit conditions of item 26 above:		
27.1	Conductor temperature corresponding to item 26.1	°C	
27.2	Metal sheath temperature corresponding to item 26.2	°C	
28	Method of installation (ie: laid directly in the ground, drawn into ducts, erected in air, or in concrete cable trench)		
29	Depth of laying:		
29.1	Twin and multicore cables to axis of cable	mm	
29.2	Single core cables in close trefoil formation to axis of uppermost cable	mm	
29.3	Single core cables in flat formation to axis of cable	mm	
29.4	Cables in ducts to axis of duct	mm	
30	Spacing:		
30.1	Twin and multi core cables between axis of adjacent cables	mm	
30.2	Single core cables in close trefoil formation between axis of trefoils	mm	

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ITEM	DESCRIPTION	UNIT	TECHNICAL PARTICULARS
30.3	Single core cable in flat formation between axis of cables forming one three phase circuit.	mm	
31	Applicable technical standard		
32	Estimated length for high voltage power cable		

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3 HIGH VOLTAGE POWER CABLE SEALING ENDS

ITEM	DESCRIPTION	UNIT	TECHNICAL PARTICULARS
1	Manufacturer's name and country		
2	Manufacturer's type and identification		
3	Rated service voltage	kV	
4	Principal insulation:		
4.1	Material		
4.2	Overall length, total	max.mm	
4.3	External diameter	max.mm	
4.4	Internal diameter of insulator	max.mm	
4.5	Total external leakage distance	m	
4.6	Protected external leakage distance (90° shadow)	mm	
5	Method of connecting cable core to sealing end terminal.		
6	Material of fittings:		
6.1	Sealing end dome		
6.2	Base ring		
6.3	Base plate		
7	Total weight of sealing end without cable end 3 pcs		
8	Dry withstand voltage (1min. power frequency routine test)	kV(rms)	
9	Minimum wet withstand voltage (30 sec. power frequency type test on insulator only)	kV(rms)	
10	Full wave withstand test (impulse voltage type test on complete terminals 1.50 micro sec.)	kV(rms)	

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ITEM	DESCRIPTION	UNIT	TECHNICAL PARTICULARS
11	Under oil flash over or puncture withstand voltage (impulse voltage type test on insulator only)		
12	Power factor/voltage routine test	kV	
13	Visible discharge test (power frequency) Type test on insulator only	kV	

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4 LOW VOLTAGE POWER CABLES

4.1 General

ITEM	DESCRIPTION	UNIT	TECHNICAL PARTICULARS
1	Manufacturer's name and country		
2	Applicable technical standard		
3	Voltage rating	kV	
4	Conductor material		
5	Type of conductor (stranded or solid)		
6	Conductor insulation material		
7	Insulation resistance at 20°C	mΩ/Km	
8	Sheath material		
9	Composition of sheath:		
a)	Lead sheath		
	lead	%	
	Tin	%	
	Cadmium	%	
	Antimony	%	
b)	Other sheath		
10	Armoring material		
11	Number of layers of steel tapes		
12	Type of outer sheath and color		
13	Minimum bending radius	× O.D.	
14	Test voltage levels	kV	

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4.2 Special for each type

ITEM	DESCRIPTION	UNIT	TECHNICAL PARTICULARS
1	Manufacture's type and designation		
2	No. of cores and core cross section area	No./mm ²	
3	Normal current carrying capacity (in air), at 30 °C	A	
4	Thickness of core insulation	mm	
5	Color code of cores		
6	Thickness of sheath	mm	
7	Minimum thickness of insulation between core and sheath	mm	
8	Armouring thickness	mm	
9	External diameter of completed cable	mm	
10	Weight per meter of completed cable	kg	
11	Estimated length which will be provided per drum	m	
12	Estimated length of cable to be supplied	m	
13	Max. current in inter shield (armours or shield) under line ground fault condition	A	
14	Resistance of each core per km at 20 °C	Ω	
15	Mean electro - static capacitance of each conductor to earth per km of complete cable		
16	Estimated length for low voltage power cable	m	

Important note:

Repeat on extra sheets for each type of 400 & 230 V AC and 48 & 110 VDC power cables.

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5 CONTROL & PROTECTION CABLES

5.1 General

ITEM	DESCRIPTION	UNIT	TECHNICAL PARTICULARS
1	Manufacturer's name and country		
2	Applicable technical standard		
3	Voltage rating	kV	
4	Conductor material		
5	Type of conductor (stranded or solid)		
6	Conductor insulation material		
7	Insulation resistance at 20oC	mΩ /Km	
8	Sheath material		
9	Composition of sheath:		
a)	Lead sheath		
	lead	%	
	Tin	%	
	Cadmium	%	
	Antimony	%	
b)	Other sheath		
10	Armouring material		
11	Number of layers of steel tapes		
12	Type of outer sheath and colour		
13	Minimum bending radius	× O.D.	
14	Test voltage levels	kV	

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5.2 Special for each type

ITEM	DESCRIPTION	UNIT	TECHNICAL PARTICULARS
1	Manufacture's type and designation		
2	No. of cores and core cross section area	No./mm ²	
3	Normal current carrying capacity (in air), at 30 °C	A	
4	Thickness of core insulation	mm	
5	Color coder numbering code of cores		
6	Thickness of sheath		
7	Minimum thickness of insulation between core and sheath	mm	
8	Armouring thickness	mm	
9	External diameter of completed cable	mm	
10	Weight per meter of completed cable	kg	
11	Estimated length which will be provided per drum	m	
12	Estimated length of cable to be supplied	m	
13	Max. current in inter shield (armours or shield) under line ground fault condition	A	
14	Resistance of each core per km at 20 °C	Ω	
15	Mean electro - static capacitance of each conductor to earth per km of complete cable		
16	Estimated length for control & protection cables	m	

Important note:

Repeat on extra sheets for each type of control & protection cables.

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6 CABLE LADDER & TRAYS

ITEM	DESCRIPTION	UNIT	TECHNICAL PARTICULARS
1	Manufacturer's name and country		
2	Manufactures type and designation		
3	Material		
4	Estimated quantity which will be provided for each substation separately		
-	Tenderers shall attach specification sheets including data about dimensions, weight and mounting details.		