

Doc Number: SEKXLT-XP-0203-GRSSV
Release: 1
Issued by: Susie Almaguer
CLIENT: TransCanada

TRANSFORMER DATA SHEET

SHT 1 OF 3

PROJECT: Keystone XL Oil Pipeline Project
FABR. SPEC: 25472-100-3PS-ET00-W0001
TAG NO.: 128-GRSSV-BO-T-01
SERVICE: Power Transformer
SITE: Grassy Creek Station

APPLICABLE TO: QUOTATION PURCHASE AS-BUILT
MANUFACTURER: Siemens Transformadores S.A de C.V.
SERIAL NO.: T.040N.001092.02
MODEL: _____
NO. REQUIRED: 1

SITE CONDITIONS

ALT (m)	Less than 1000 m	ATM PRESS (kpa(a))	
RELATIVE HUMIDITY		MIN (%)	MAX (%) 95
OUTDOOR TEMPERATURE		MIN (°C)	MAX (°C) 40
INDOOR TEMPERATURE		MIN (°C)	MAX (°C)
SEISMIC DATA	Per separately provided climate data		
LOCATION	Document		
<input type="checkbox"/> INDOOR	<input checked="" type="checkbox"/> OUTDOOR		
<input type="checkbox"/> TROPICAL	<input type="checkbox"/> DUST		
<input type="checkbox"/> CORROSIVE GASES			
<input checked="" type="checkbox"/> OTHER	Blowing Snow and Dust		

CURRENT TRANSFORMER

ITEM	PRIMARY	SECONDARY
MANUFACTURER	Meramec	Meramec
TYPE	Bushing	Bushing
VOLTAGE CLASS	1.1 kV	1.1 kV
QUANTITY	6	3
MOUNTING LOCATION	Bushing	Bushing
RATIO	200/5A	4000/5A
ACCURACY	C200	C200
THERMAL RF RATING	2.0	2.0

POWER SYSTEM

UTILITY COMPANY: SaskPower CONTACT: _____
PHONE No.: _____
FAULT LEVEL: _____
MVA BASE: _____
POSITIVE: X/R RATIO Note 11 R pu Note 11 X pu Note 11
ZERO: X/R RATIO Note 11 R pu Note 11 X pu Note 11

BUSHING DATA

ITEM	PRIMARY (Note 10)	SECONDARY (Note 5)
MANUFACTURER	ABB	ABB
TYPE	Oil Filled	Porcelain
VOLTAGE RATING (V)	138	15
CURRENT RATING (A)	800	4000
INSULATION	Oil	Porcelain
CREEPAGE(HIGH CREEP/HIGH STRENGTH)	3188 mm	351 mm
BIL (KV)	650	110
LOW FREQ. FLASHOVER-WET/DRY (KV)	Note 1	Note 1

TRANSFORMER DESIGN

DISTRIBUTION TRANSFORMER
 CSA C2

RATING (3 PHASE, 60 HZ)
 20/22.4/26.66/29.86/33.33/37.33 MVA
TEMP. RISE 65°C 55°C
 55/65°C

PAD MOUNTED TRANSFORMER
 CSA C227.5
 CSA C227.4 (Dead Front)
IMPEDANCE STD 9.7 %
POSITIVE SEQ. IMP 9.7 %
ZERO SEQ. IMP 7.92 %
X/R RATIO 23.6
COOLING TYPE
 ONAN
 ONAN/ONAF/ONAF (Note 2)

POWER TRANSFORMER
 CSA, ANSI, IEEE, ASTM
 ANSI, IEEE, ASTM

SURGE ARRESTER (Note 6)

REQUIRED NON REQUIRED
LOCATION: HIGH VOLTAGE LOW VOLTAGE

25472-101-V1A-MPC0-W0127
02
Supplier Document Status
Code 1
Code 1 = Work may proceed.
Code 2 = Revise and resubmit. Work may proceed subject to resolution of indicated comments.
Code 3 = Revise and resubmit. Work may not proceed.
Code 4 = Review not required. Work may proceed.
Permission to proceed does not constitute acceptance or approval of design details, calculations, analyses, test methods, or materials developed or selected by the Supplier and does not relieve the Supplier from full compliance with contractual obligations.
Responsible Engineer: **Kothari_Manish**
Date Signed: **05/02/2011**
VPTL - **VPTL-02386**
Equipment No. - **128-GRSSV-BO-T-01**

WINDING CONNECTION
 DELTA / WYE OTHER
 VECTOR GROUP Dyn1
 PRIMARY 138,000 V Std BIL 550 KV
 SECONDARY 6,900 V Std BIL 110 KV

WINDING MATERIAL
PRIMARY COPPER ALUMINUM
SECONDARY COPPER ALUMINUM

FANS AND PUMPS

AUX. POWER SUPPLY 208VAC, 3PH, 60 HZ
 OTHER Note 7
MOTOR ENCLOSURE TEFC OTHER
INSUL. TEMP. RISE CLASS F, CLASS B RISE
 OTHER
AUTOMATIC CONTROL FOR FANS REQUIRED NON-REQUIRED

SYSTEM CONNECTIONS & FEATURES

PRIMARY	SECONDARY	ITEM
<input checked="" type="checkbox"/>	<input type="checkbox"/>	TOP MOUNTED BUSHINGS (SEGMENT 3 - Note 3)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	SIDE MOUNTED BUSHINGS (SEGMENT 1 - Note 3)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	EXPOSED BUSHINGS
<input type="checkbox"/>	<input checked="" type="checkbox"/>	ENCLOSED BUSHINGS (terminal box)
<input type="checkbox"/>	<input checked="" type="checkbox"/>	NEUTRAL GROUNDING <input type="checkbox"/> SOLID <input checked="" type="checkbox"/> RESISTANCE NGR 25 A, 10 Sec (Note 4)
<input type="checkbox"/>	<input type="checkbox"/>	TERMINAL BOX / THROAT
<input type="checkbox"/>	<input type="checkbox"/>	TOP ENTRY
<input type="checkbox"/>	<input type="checkbox"/>	BOTTOM ENTRY
<input type="checkbox"/>	<input type="checkbox"/>	BUS DUCT ENTRY
<input type="checkbox"/>	<input checked="" type="checkbox"/>	SPACE FOR STRESS CONES
<input type="checkbox"/>	<input type="checkbox"/>	POT HEADS _____
<input type="checkbox"/>	<input type="checkbox"/>	POT HEADS _____
<input type="checkbox"/>	<input type="checkbox"/>	CABLES
<input checked="" type="checkbox"/>	<input type="checkbox"/>	TYPE AAC SIZE 477 MCM NO./PH 1
<input type="checkbox"/>	<input checked="" type="checkbox"/>	TYPE TECK SIZE 750 MCM NO./PH 4

TAP CHANGERS

NLTC LOCATION: LOW VOLTAGE HIGH VOLTAGE
STEPS 4 STEPS OF 2.5% (+5% to -5%) - Full capacity at all taps
 OTHER
 LTC LOCATION: LOW VOLTAGE HIGH VOLTAGE
 32 STEPS OF 5/8% (+10% to -10%) - Full capacity at all taps
 OTHER
 AUTOMATIC (LTC only)
 NON AUTOMATIC

TRANSFORMER CONTROL CABINET

ENCLOSURE NEMA 4X OTHER
 HINGED DOOR OTHER
 LOCKABLE
SPACE HEATER WITH THERMOSTAT REQUIRED NON REQUIRED

- NOTES:**
- Vendor to fill in data
 - Two stage fan cooling
 - As per ANSI C57.12.10-1997
 - Supplied and installed on a concrete pad by TCPL.
 - 6.9 kV Bushings to be tested as per TCPL/Siemens/WP agreement for ensuring suitability for application (11/06/09)
 - Vendor to fill in on surge arrester Data Sheet 25472-100-EGD-EGL0-W0002
 - Fans are to have individual Circuit Breakers/Fan
 - Insulating Oil must meet or exceed the requirements of C57.106. Note the 'Required' column indicates the limits of new mineral oil as received from the supplier. Other limits apply prior to energisation as noted in C57.106.
 - Transformer tags per separate list, see page 3 of 3.
 - High Voltage Bushings construction shall be in accordance with IEEE C57.19.01
 - Utility supplied data. Data will be added when received.

WorleyParsons resources & energy	JOB NO. 08E4490	REV	ISSUED FOR	DATE	BY	CHKD	APPR
	DATA SHEET NO. 25472-100-ETD-ET00-W0002	00	Design	14 April 10	FM	GI	J.K.M.S.V

Doc Number: 08E4490-EGD-ET00-W0001
Release: 1

TRANSFORMER DATA SHEET

SHT 2 OF 3

Issued by: Susie Almaguer
CLIENT: TransCanada Keystone Pipeline Limited Partnership
PROJECT: Keystone XL Oil Pipeline Project
FABR. SPEC: 25472-100-3PS-ET00-W0001

TAG NO.: 128-GRSSY-BO-T-01
SERVICE: Power Transformer
SITE: Grassy Creek Station

APPLICABLE TO: QUOTATION PURCHASE AS-BUILT
MANUFACTURER: Siemens Transformadores S.A. de C.V. MODEL: _____
SERIAL NO.: T.040N.001092.02 NO. REQUIRED: 1

- OPTIONAL ACCESSORIES**
- LIQUID LEVEL INDICATOR W / ALARM CONTACTS
 - LIQUID TEMP. INDICATOR W / TRIP / ALARM / FAN CONTACTS
 - WINDING TEMP. INDICATOR W / TRIP / ALARM CONTACTS
 - VACUUM PRESSURE GAUGE W / ALARM CONTACTS
 - VACUUM PRESSURE BLEEDER DEVICE
 - GAS DETECTOR RELAY WITH INDICATOR
 - SUDDEN PRESSURE RELAY W / TRIP / ALARM CONTACTS
 - EMERGENCY PRESSURE RELIEF DEVICE W / ALARM CONTACTS
 - LIQUID DRAIN VALVE WITH THREADED PLUG
 - LIQUID SAMPLING VALVE WITH THREADED PLUG
 - RADIATOR VALVES
 - RADIATOR DRAIN PLUGS AND VENT PLUGS
 - LIFTING EYES
 - JACKING FACILITIES
 - NAMEPLATE FOR BUYER'S EQUIPMENT NUMBER
 - SPARE PARTS: 1 spare set of gaskets
 - SPECIAL TOOLS

INSULATING OIL ELECTRICAL DATA (Note 8)

GENERAL	UNITS	REQUIRED	VENDOR CONFIRMATION
MANUFACTURER		PETRO CANADA	
TRADE NAME		LUMINOL	
VENDOR'S CATALOG NUMBER		35	
DIELECTRIC			
DIELECTRIC BREAKDOWN VOLT. 60 Hz, ASTM D877	KV / MIN.	30	55
DIELECTRIC BREAKDOWN VOLT. IMPULSE COND. ASTM D3300	KV / MIN.	Note 1	>300
TEST DATA			
NEUTRALIZATION NUMBER ASTM D 974	mgKOH/g	0.03 Max.	<0.01
WATER CONTENT ASTM D1533	ppm	Note 1	<25
INTERFACIAL TENSION @ 25°C, ASTM D971	dynes/cm	40	48
SPECIFIC GRAVITY @ 15°C, ASTM D1298		0.85	0.835
GASSING TENDENCY, ASTM D2300	µL/min	Note 1	-10
CORROSIVE SULPHUR, ASTM D1275B	Y/N	Note 1	NONCORROSIVE
PCB CONTENT, ASTM D4059	ppm	Nil	NIL
VISUAL			
COLOR, ASTM D1500		Clear/pale amber	<0.5
CONDITION, ASTM D1524		Clear	clear
TEMPERATURE POINTS			
FLASH POINT, ASTM D92	°C	133 Min.	170
POUR POINT, ASTM D5950 / D97	°C	-58 MIN.	-60
ANILINE POINT, ASTM D611	°C	Note 1	NA
OXIDATION STABILITY FOR INHIBITED OIL, ASTM D2440 / D2112			
WT.% Sludge, @ 72 hrs	%	Note 1	NA
NEUTRALIZATION NUMBER @ 72 hrs	mgKOH/g		NA
WT.% Sludge, @ 164 hrs	%	Note 1	<0.01
NEUTRALIZATION NUMBER @ 164 hrs	mgKOH/g	Note 1	<0.01
OXIDATION STABILITY FOR INHIBITED OIL, IEC 61125 Method C			
WT.% Sludge	%	Note 1	<0.02
NEUTRALIZATION NUMBER	mgKOH/g	Note 1	<0.02
POWER FACTOR AT 90°C		Note 1	<0.02
KINEMATIC VISCOSITY, ASTM D445			
VISCOSITY AT 0 °C	Sybolt sec.	Note 1	53
VISCOSITY AT 40 °C	Sybolt sec.	Note 1	9.2
VISCOSITY AT 100 °C	Sybolt sec.	Note 1	2.8
VISCOSITY AT -40 °C	Sybolt sec.	Note 1	1230
POWER FACTOR, ASTM D924			
POWER FACTOR AT 25°C	% MAX	0.05	<0.0001
POWER FACTOR AT 100°C	% MAX	0.3	0.001
INHIBITOR CONTENT, TYPE II OIL, ASTM D2668	%	>0.08 - 0.3	0.20

- MISCELLANEOUS**
- PAINT**
- STD
 - ASA 70 / II Enamel over epoxy (Light gray ANSI 70)
 -
- WEIGHTS**
- CORE & COILS: 30164 kg
 - TANK & FITTINGS: 10668 kg
 - COOLING LIQUID: 1871 kg
 - VOLUME TOTAL: 27308 litre
 - TOTAL INSTALLED WT.: 72575 kg
- TRANSFORMER LOSSES @ RATED VOLTAGE**
- NO LOAD: 95 kW
 - FULL LOAD: 322.03 kW
- EFFICIENCY @**
- 50% FULL LOAD: 99.65 %
 - 75% FULL LOAD: 99.6 %
 - 100% FULL LOAD: 99.5 %
 - 125% FULL LOAD: 99.4 %
- TESTING**
- As per Specifications
- SOUND LEVEL**
- ANSI C57.12.00 CSA-C88 M90
 - MAXIMUM AUDIBLE SOUND LEVEL ONAN: 73 dBA
 - MAXIMUM AUDIBLE SOUND LEVEL ONAF1/2: 75/76 dBA
- GROUNDING PADS**
- TWO (2) GROUNDING PADS WITH LUGS
 - OTHER
 - REQUIRED FOR # 2/0 AWG to 4/0 AWG CU
 - OTHER

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00	Design	14 April 10	FM	GI	SM DV



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