

Administrative Services

Purchasing Division

INVITATION TO BID

Sealed bids will be received and publicly opened at the office of The Director of Purchasing and Risk Management, 256 West Mountain Avenue, Fort Collins, Colorado 80521, (P O Box 580, 80522) at the time and date noted on the bid proposal and/or contract documents

Bids must be received at the Office of the Director prior to the opening time (our clock)

SPECIAL INSTRUCTIONS

All bids must be signed by an authorized representative of the company with the legal capacity to bind the company to the agreement Bids may be withdrawn up to the date and hour set for opening Once bids have been accepted by the City and opening time has passed, failure to enter into contract or honor the purchase order will be cause for removal of supplier's name from the city of Fort Collins' bidders list for a period of twelve months from the date of the opening The City may also pursue any remedies available at law or in equity Bid prices must be held firm for a period of forty-five days after bid openings

Submission of a bid is deemed as acceptance of all terms, conditions and specifications contained in the City's specifications initially provided to the bidder Any proposed modification must be accepted in writing by the City prior to award of the bid

Only bids properly received by the Purchasing Department will be accepted

No proposal will be accepted from, or any purchase order awarded, to any person, firm or corporation in default on any obligation to the City

All bids must be labeled with both the project name and bid number indicated on the bid proposal

Bids must be furnished exclusive of any federal excise tax, wherever applicable

Bidders must be properly licensed and secure necessary permits wherever applicable

Vendors not responding to requests for bid shall be removed from our automated listing for the requested commodities/services

The City may elect where applicable, to award bids on an individual item/group basis or on a total bid basis, whichever is most beneficial to the City The City reserves the right to accept or reject any and all bids, and to waive any irregularities or informalities

Sales Prohibited/Conflict of Interest No officer, employee, or member of City Council, shall have a financial interest in the sale to the City of any real or personal property, equipment, material, supplies or services where such officer or employee exercises directly or indirectly any decision-making authority concerning such sale or any supervisory authority over the services to be rendered This rule also applies to subcontracts with the City Soliciting or accepting any gift, gratuity favor, entertainment, kickback or any items of monetary value from any person who has or is seeking to do business with the City of Fort Collins is prohibited

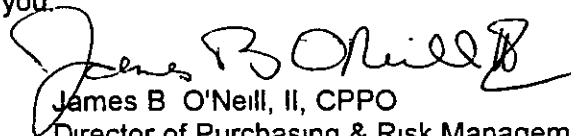
Freight Terms Unless otherwise noted, all freight is F O B destination, freight prepaid All freight charges must be included in prices submitted on proposal

Discounts Any discounts allowed for prompt payment, etc , must be reflected in bid figures and not entered as separate pricing on the proposal form

Purchasing Restrictions Your authorized signature of this bid assures your firm's compliance with the City's purchasing restrictions on cement A copy of the Resolution 91-121 is available for review in the Purchasing Division or the City Clerk's office

Collusive or Sham Bids Any bid deemed to be collusive or a sham bid will be rejected and reported to authorities as such Your authorized signature of this bid assures that such bid is genuine and is not a collusive or sham bid

Bid Results For information regarding results for individual bids send a self-addressed, self-stamped envelope and a bid tally will be mailed to you.


James B O'Neill, II, CPPO
Director of Purchasing & Risk Management

FIRM NAME _____

**CITY OF FORT COLLINS
BID PROPOSAL
BID NO 5400
BID DATE: 2:00 p m (our clock) July 6, 1999**

WE HEREBY ENTER OUR BID FOR THE CITY OF FORT COLLINS' REQUIREMENTS FOR **TRANSFORMERS, 50 KVA** PER THE BID INVITATION AND ANY REFERENCED SPECIFICATIONS

QUANTITY

100 Ea

DESCRIPTION

Transformer, 50 KVA, modified over-head, single phase distribution with one high-voltage bushing well, high voltage rating 13200 GRDY/ 7620 Low voltage rating 120/240 Serial number 151 to be in accordance with specification #368-105-151, revision JJ

\$ _____ Ea \$ _____ Total

Delivery in Weeks _____

Mfr & Mfr # _____

Guaranteed No Load Loss _____

Guaranteed Full Load Loss _____

Guaranteed Total Load Loss _____

Impedance (%) _____

The transformers being bid meet or exceed the specifications Yes ___ No ___ If not, please list exceptions on a separate sheet of paper and attach to your bid

Firm Name _____

Alternate 1

QUANTITY

100 Ea

DESCRIPTION

Transformer, 50 KVA submersible, single phase with one cover mounted separable insulated load break high voltage bushing well, three cover mounted stud secondary bushings, submersible bayonet fuse High voltage rating 13200 GRDY/7620, low voltage rating 240/120 Per drawing #368-110, revision A

\$ _____ Ea \$ _____ Total

Delivery in Weeks _____

Mfr & Mfr # _____

Guaranteed No Load Loss _____

Guaranteed Full Load Loss _____

Guaranteed Total Load Loss _____

Impedance (%) _____

The transformers being bid meet or exceed the specifications Yes ___ No ___ If not, please list exceptions on a separate sheet of paper and attach to your bid

Firm Name _____

Alternate 2:

QUANTITY

100 Ea

DESCRIPTION

Transformer, 50KVA underground-type, single phase with one cover mounted separable insulated load break high voltage bushing well, three low-voltage cable leads, submersible bayonet fuse High voltage rating 13200 GRDY/7620, low voltage rating 240/120 Per ANSI C57 12 23

\$ _____ Ea \$ _____ Total

Delivery in Weeks _____

Mfr & Mfr # _____

Guaranteed No Load Loss _____

Guaranteed Full Load Loss _____

Guaranteed Total Load Loss _____

Impedance (%) _____

The transformers being bid meet or exceed the specifications Yes___ No ___ If not, please list exceptions on a separate sheet of paper and attach to your bid

Escalation is _____, is not _____ applicable for the transformers bid If escalation applies, the bidder shall indicate in the bid specific items or materials subject to escalation, and shall give the method and indices to be used in computing the amount thereof Escalation occurring after the quoted delivery date will not be paid unless delays are the result of actions by the City Escalation occurring after acceptance, if purchaser exercises the option to delay shipment after manufacturing is completed, will not be paid

For purposes of warranty and service, ONLY approved manufacturers or distributors authorized by an approved manufacture to serve the Fort Collins area may bid

DELIVERY WILL BE AN EVALUATION FACTOR

City of Fort Collins reserves the right to purchase any combination of the proposed transformers

City of Fort Collins reserves the right to evaluate best combination of design, delivery and price

Bid #5400

SUPPLEMENTAL INSTRUCTIONS

Prices quoted must remain firm for a 30 day period after the opening date

Freight terms F O B destination freight prepaid All freight charges must be included in pricing submitted on proposal and not entered as separate pricing

Any discount allowed by Vendor for prompt payment, etc must be reflected in quoted figure, and not entered as separate pricing

The City reserves the right to accept or reject any and all quotes

Bidder not responding to the services requested in this bid shall be removed from our automated listing for Not applicable

Any questions or inquiries regarding this bid should be directed to

Opal F Dick, CPPO, Senior Buyer – (970) 221-6778

SIGNATURE AND TITLE	TYPED OR PRINTED NAME AND TITLE	

COMPANY NAME	(AREA CODE) TELEPHONE NUMBER/FAX NUMBER	

ADDRESS	STREET, CITY, STATE, ZIP	DATE

THE CITY OF FORT COLLINS

Light and Power Department
P O Box 580
Fort Collins, CO 80522

SPECIFICATION NO. 368-105

TITLE OVERHEAD-TYPE, SINGLE PHASE
DISTRIBUTION TRANSFORMERS
WITH SEPARABLE
INSULATED LOAD BREAK HIGH-VOLTAGE CONNECTORS

PREPARED BY.



Tim M Sagen, Design Engineer

ORIGINATED: March 3, 1973

REVISED September, 1997

PREVIOUS REVISION DESCRIPTIONS ON FILE

REVISION DESCRIPTION	APPROVED
<p>REVISION II: Table of contents Update</p> <p>Paragraph 3 2 2 1 1; 3 2 4 2 Editorial</p> <p>Paragraph 3.2.3.1. update ANSI reference to 1985</p> <p>Paragraph 3 2 3 2 Change lead type terminals to stud type, update ANSI reference to 1985</p> <p>Paragraph 3 2 5 2 Delete reference to Table II</p> <p>Paragraph 3 2.5 6 Update ANSI reference to 1987, change "non-PCB" to "contains < 1 ppm PCB"</p> <p>Paragraph 3 2 6 1 Change Table III to Figure 2</p> <p>Paragraph 3 2 7. Delete ratio requirement, update ANSI reference to 1987</p> <p>Paragraph 4 2 2 Change Impedance tolerance to within range specified</p> <p>Table I Change lead type LV terminals to stud type Add impedance ranges on 131, 151 and 156</p> <p>Add Figure 1</p> <p>Change Table III to Figure 2</p> <p>Appendix C delete tank coating from table</p>	<p><i>Tim M. Logan</i> <i>Susan Coram</i> <i>7-27-94</i></p>
<p>REVISION JJ Paragraph 5 0 Add pallet requirements</p>	<p><i>Tim M. Logan</i> <i>8-4-97</i></p>

LIST OF ACTIVE PAGES

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2	JJ				
3	JJ				
4	II				
5	II				
6	II				
7	II				
8	II				
9	II				
10	II				
11	II				
12	JJ				
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SPECIFICATION 368-105
FOR
OVERHEAD-TYPE, SINGLE PHASE
DISTRIBUTION TRANSFORMERS WITH SEPARABLE
INSULATED LOAD BREAK HIGH-VOLTAGE CONNECTORS

1.0 SCOPE

This Specification establishes the minimum requirements for single phase, 60 hertz, mineral-oil-filled self cooled (O I S C.) overhead-type distribution transformers with separable insulated load break high voltage connectors, rated 250 kilovolt-amperes (KVA) and smaller, high-voltage 7620/13200Y and dual voltage 7620/13200Y x 2400/4160Y; low voltage 120/240, 240/480, 277 volts, and 4160Y/2400.

2.0 APPLICABLE DOCUMENTS

The following American National Standards (ANSI) for Distribution, Power, and Regulating Transformers and Shunt Reactors form a part of this Specification.

General Requirements	C57 12.00
Overhead-Type Distribution Transformers	C57 12 20
Terminal Marking and Connections	C57 12.70
Terminology	C57.12.80
Test Code	C57 12 90
Appendix to ANSI C57.12 20	C57.91
Separable Insulated Connectors	ANSI/IEEE 386

3.0 REQUIREMENTS

3.1 GENERAL REQUIREMENTS FOR DESIGN

Unless otherwise stated in this Specification, all transformers shall be new and shall conform to the American National Standard Requirements for Overhead-Type Distribution Transformers, ANSI C57.12.20 - latest revision. In case of conflict, the requirements of the following documents shall apply in the priority shown:

1. This Specification.
2. Referenced ANSI Standards.

Approved manufacturers are listed in Appendix C. For purposes of warranty and service, any distributor bidding must be an authorized distributor appointed by an approved manufacturer to serve the Fort Collins area.

3.2 SPECIFIC REQUIREMENTS FOR DESIGN

3.2.1 FUNCTIONAL DESCRIPTION

Transformers of this design are for installation on an underground power system utilizing separable insulated connectors and may be installed in underground vaults subject to submersion. They may also be padmounted under an enclosure, or pole mounted. The transformer tank, cover, and all external appurtenances shall be of corrosion-resistant material, unless they are otherwise rendered corrosion resistant.

3.2.2 RATINGS

3.2.2.1 KILOVOLT-AMPERE-RATINGS

3.2.2.1.1 NAMEPLATE RATING

Kilovolt-ampere ratings are continuous and based on not exceeding either a 65°C average winding temperature rise or an 80°C hot spot temperature rise. The temperature rise of the insulating oil shall not exceed 65° when measured near the top of the tank. The KVA rating shall be regarded as a test rating which defines an output which can be taken from the apparatus under the prescribed conditions of test within the limitations of all applicable standards. KVA ratings shall be in accordance with Table I.

3.2.2.1.2 ADDITIONAL SUPPLEMENTAL LOADING

Additional supplemental loadings may be carried as recommended by ANSI C57.91.

3.2.2.2 VOLTAGE RATINGS

Secondary and primary voltage ratings shall be in accordance with Table I.

3.2.2.3 **IMPEDANCE**

Nominal impedance voltage shall be in accordance with Table I of this specification. Completed units may vary from the specified nominal up to the tolerance specified in ANSI C57 12 00.

3.2.2.4 **BASIC IMPULSE INSULATION LEVELS**

The high voltage BIL shall be 95 kV. The low voltage BIL shall be 30 kV

3.2.3 **BUSHINGS AND TERMINALS**

All internal leads and connections, on both high and low voltage, shall be sized to carry full ampere rating, including overload rating of transformer.

3.2.3.1 **HIGH VOLTAGE TERMINALS**

The number of high voltage terminals required is specified in Table I. High voltage terminal(s) shall consist of cover mounted universal type flowerpot bushing well(s) conforming to ANSI/IEEE 386-1985 Fig. 3.

3.2.3.2 **LOW VOLTAGE TERMINALS**

Terminal type and number shall be in accordance with Table I of this specification. Eyebolt and spade terminals shall be singly mounted sidewall type. Stud type terminals shall be singly mounted on the sidewall, internally or externally clamped, with dimensions in accordance with Figure 1 of this specification. All non-metallic components of the terminals shall be of a material resistant to ultra-violet degradation. Transformers with secondary voltages above 480V require cover mounted bushing well(s) having interfaces conforming to ANSI/IEEE 386-1985 Fig. 3.

3.2.4 **NEUTRAL TERMINATION**

3.2.4.1 On transformers having one high voltage bushing, the H₂ end of the winding shall be securely grounded internally.

3.2.4.2 On units having three external eyebolt or spade type low-voltage terminals, the X_2 connection of the winding shall be isolated and an adequate external copper ground strap shall be provided from the neutral bushing to a standard tank ground pad.

On units having lead type low-voltage terminals, the X_2 connections of the winding shall be connected to the tank internally and such connection shall be indicated on a label next to the X_2 lead as well as on the nameplate.

Ground connections shall be suitably sized for the short-circuit rating of the transformer as defined in ANSI C57.12.00

3.2.4.3 An adequate stainless steel connection shall provide electrical continuity between the tank and the cover.

3.2.5 ACCESSORY EQUIPMENT

In addition to the requirements of ANSI, accessory equipment shall be provided in accordance with Table I and the following details.

3.2.5.1 Current-protecting (CP) when specified in Table I shall include internal weaklink primary fuse, secondary breaker, signal light, and emergency control handle Internal fusing (internal) when specified in Table I shall include an internal partial range current limiting fuse in conjunction with an internal eutectic (temperature sensitive) weak link fuse.

3.2.5.2 When required by Table I, an RTE Bay-o-net fuse and internally mounted ELSP partial range current limiting fuse(s) shall be furnished Bay-o-net fuses shall be top mounted or sidewall mounted as required in Table I.

3.2.5.3 When the transformer is specified as a dual voltage unit, an externally operated dual voltage switch shall be provided.

- 3.2.5.4 Taps, when required, shall be full capacity above and below normal and shall be provided with an externally operated tap changer switch. On dual voltage transformers, taps shall be furnished on the top voltage only
- 3.2.5.5 Cover mounted pocket type cable accessory parking stand for a loadbreak stand off device shall be provided.
- 3.2.5.6 Cover mounted instruction nameplate conforming to 5.12 of ANSI C57.12.00-1987, Nameplate A, shall be provided. Also, on the nameplate or label affixed near it, the manufacturer shall indicate that the dielectric fluid contains less than 1 ppm PCB.
- 3.2.6 TANK
- 3.2.6.1 An adequate tank coating for underground vault application shall be provided. Appendix B is provided as a reference for comparing coating requirements. The Light and Power Department, Engineering Division, is the only authority regarding the adequacy of proposed coatings. Figure 2 shows outside dimensions
- 3.2.6.2 PRESSURE
- The tank shall be equipped with a Qualitrol #202-014-01 or 202-030-01 pressure relief device or a pressure relief cover. If a pressure relief cover is used, the cover assembly shall remain effectively sealed for overloads and external secondary short circuits of the magnitude and duration allowed by industry standards and loading guides, but shall relieve pressure at a minimum of 8 psi gauge if designed to reseal; or at a minimum of 20 psi g if designed for pressure relief without resealing. If a pressure relief cover is used, a manual means of venting the tank before removal of the cover shall be provided. Regardless of which means of pressure relief is provided, the tank and other components of the tank shall be of sufficient strength to withstand, without damage or permanent distortion, the pressures occurring prior to pressure relief, as well as pressures occurring due to normal overloads and external secondary short circuits.

3.2.6.3 GROUNDING PROVISIONS

A minimum of two tank mounted ground nuts fitted with a solderless type connector for AWG conductor size No. 8 solid to No. 2 stranded shall be provided. One ground connector shall be on the tank sidewall, near the top of the tank, below the primary bushing and the other shall be near the base, below the primary bushing.

3.2.7 LOSSES

The total losses of a transformer shall be the sum of the excitation losses and the load losses (I^2R losses). Load loss tests shall be performed and reported on all units regardless of whether or not a record of such tests is available on duplicate units. Loss evaluations and loss costs will be based on the values shown in the "Special Conditions and Supplemental Instructions to Bidders". Transformers will be evaluated on excitation losses and I^2R losses at the specified rates. If tested losses exceed quoted losses but are within the tolerances of Table 18, ANSI C57.12 00-1987, the additional cost incurred from the differential of losses will be calculated using the following equation and the above specified rates and will be deducted from the original Purchase Order or back charged to the manufacturer. In Table 18 and the following equation "Units" shall mean "Transformers of the same size and design on one order."

Excess loss \$ = [No. of units] [(No. Load Loss Evaluation \$) (Avg. No. Load Losses - Quoted No. Load Losses) + (Load Loss Evaluation \$) (Avg. Load Losses - Quoted Load Losses)]. If this equation results in a negative number, no credit will be given the Supplier.

If any unit or units exceed the tolerances of Table 16, ANSI C57.12.00-1980, that unit or units shall not be shipped without express permission from the City. If accepted, the deduction for excess losses will be based on the following equation. Excess loss \$ = (No. Load Loss Evaluation \$) (No. Load Losses - Quoted No. Load Losses) But Not Less Than Zero + (Load Loss Evaluation \$) (Load Losses - Quoted Losses) But Not Less Than Zero.

4.0 QUALITY ASSURANCE

4.1 GENERAL

4.1.1 RESPONSIBILITY FOR INSPECTION

Unless otherwise specified, the vendor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the vendor may utilize his own facilities or any commercial laboratory acceptable to the City of Fort Collins. The City reserves the right to perform or witness any of the inspections set forth in this Specification where such inspections are deemed necessary.

4.1.2 TEST REPORT

The manufacturer shall furnish to the purchaser certified copies of the results of loss tests prior to payment. Copies shall be sent to the Design section as well as with the invoice. Unsigned copies are not acceptable even if accompanied by a signed cover letter.

4.2 TEST CONDITIONS

Unless otherwise specified, testing required by Section 4.4 shall be conducted under the following conditions.

4.2.1 REFERENCE TEMPERATURE

The reference temperature to which losses, impedance, regulation, and efficiency are corrected shall be 85°C

4.2.2 TOLERANCE ON IMPEDANCE VOLTAGE

Impedance on completed units shall fall within the ranges specified herein.

4.2.3 TOLERANCE ON IMPEDANCE VOLTAGE ON A TAP

The percent departure of tested impedance voltage on any tap from tested impedance voltage at rated voltage shall not be greater than the total tap voltage range expressed as a percentage of the rated voltage.

4.3 NOT USED**4.4 TESTS**

The kinds of tests to be performed and the test procedures shall be as specified in ANSI C57 12 20, ANSI C57 12 00, and C57 12 90 except impedance and load-loss tests shall be made on each unit and may not be omitted even if a record of such tests made on a duplicate unit is available

5.0 PREPARATION FOR DELIVERY

Transformers shall be prefilled with the appropriate amount of transformer oil and shall be shipped by open-bed truck Units shall be packaged in such a way as to provide for ease of handling and to protect them from shipping damage Units shall be packaged on four-way universal pallets with 34 inch minimum opening and loaded on the truck for side removal The Supplier shall give 24 hour notice prior to delivery for any shipments where an individual transformer weighs over 5,000 pounds In addition to these requirements, the Supplier shall comply with any additional requirements or modifications shown on the purchase order and/or supplemental instructions

TABLE I

STOCK NO 368-105 -SERIAL	KVA	% Z	HIGH VOLTAGE				LOW VOLTAGE		PROTECTION TYPE**
			RATING	TERMINAL(S)	TAPS		RATING	TYPE AND NUMBER OF TERMINALS	
					ABOVE	BELOW			
-111	10	TBD	13200 GRDY/7620	One bushing well	-	-	120/240*	Three Eyebolt	CP
-131	25	1 77 to 2 16	13200 GRDY/7620	One bushing well	-	-	120/240*	Three CU stud	CP
-151	50	1 77 to 2 16	13200 GRDY/7620	One bushing well	-	-	120/240*	Three CU stud	CP
-155	50	TBD	7620/13200Y	Two bushing wells	2-2½%	2-2½%	120/240*	Three 4 hole "H"	S
-156	50	TBD	13200 GRDY/7620	One bushing well	-	-	240/480	Three Eyebolt	CP
-161	75	1 86 to 2 27	13200 GRDY/7620	One bushing well	-	-	120/240*	Three CU stud	Internal
-171	100	TBD	13200 GRDY/7620	One bushing well	-	-	120/240*	Three Eyebolt	Internal
-174	100	TBD	13200 GRDY/7620	One bushing well	2-2½%	2-2½%	120/240	Four 6 hole "J"	Internal
-175	100	TBD	7620/13200Y	Two bushing wells	2-2½%	2-2½%	120-240	Four 6 hole "J"	S
-176	100	TBD	13200 GRDY/7620	One bushing well	2-2½%	2-2½%	277	Two 4 hole "H"	Internal
-177	100	TBD	7620/13200Y	Two cover mounted bushing wells	2-2½%	2-2½%	2400/4160Y	Two cover mounted bushing wells	S
-184	167	TBD	13200 GRDY/7620	One bushing well	2-2½%	2-2½%	120/240	Four 6 hole "J"	Internal
-185	167	TBD	7620/13200Y	Two bushing wells	2-2½%	2-2½%	120/240	Four 6 hole "J"	S
-186	167	TBD	13200 GRDY/7620	One bushing well	2-2½%	2-2½%	277	Two 4 hole "H"	Internal

* Reconnectable in field for 120/208 volt service

** CP refers to current-protecting (see para 3 2 5 1)

TBD = To be Determined

S refers to conventional

Internal refers to current limiting protection (see para 3 2 5 1)

TABLE I (CONT)

STOCK NO 368-105	SERIAL	KVA	% Z	HIGH VOLTAGE			LOW VOLTAGE		PROTECTION TYPE**	
				RATING	TERMINAL(S)	TAPS		RATING		TYPE AND NUMBER OF TERMINALS
						ABOVE	BELOW			
-189	167	TBD	13200 GRDY/7620	One cover mounted bushing wells	-	-	4160GRDY/2400	One cover mounted bushing well	S	
-195	250	TBD	7620/13200Y	Two bushing wells	2-2½%	2-2½%	120/240	Four 6 hole "J"	S	
-196	250	TBD	13200 GRDY/7620	One bushing well	2-2½%	2-2½%	277	Two 6 hole "J"	Internal	
-231	25	TBD	13200 GRDY/7620x 4160 GRDY/2400	One bushing well	-	-	120/240*	Three Eyebolt	CP	
-238	25	TBD	13200 GRDY/7620x 4160 GRDY/2400	One bushing well	2-2½%	2-2½%	240/480	Three Eyebolt	CP	
-251	50	TBD	13200 GRDY/7620X 4160 GRDY/2400	One bushing well	-	-	120/240*	Three Eyebolt	CP	
-258	50	TBD	13200 GRDY/7620X 4160 GRDY/2400	One bushing well	2-2½%	2-2½%	240/480	Three Eyebolt	CP	

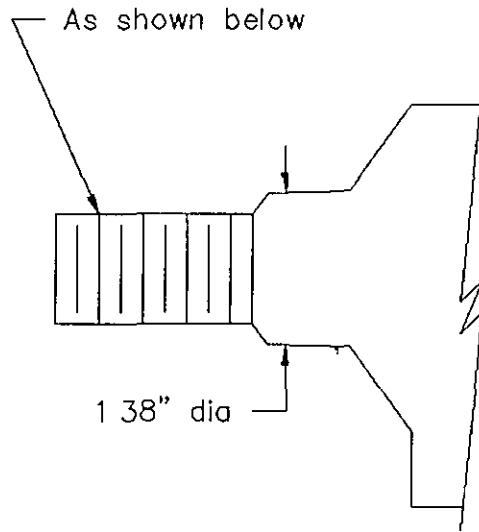
* Reconnectable in field for 120/208 volt service

** CP refers to current-protecting (see para 3 2 5 1)

TBD = To be Determined

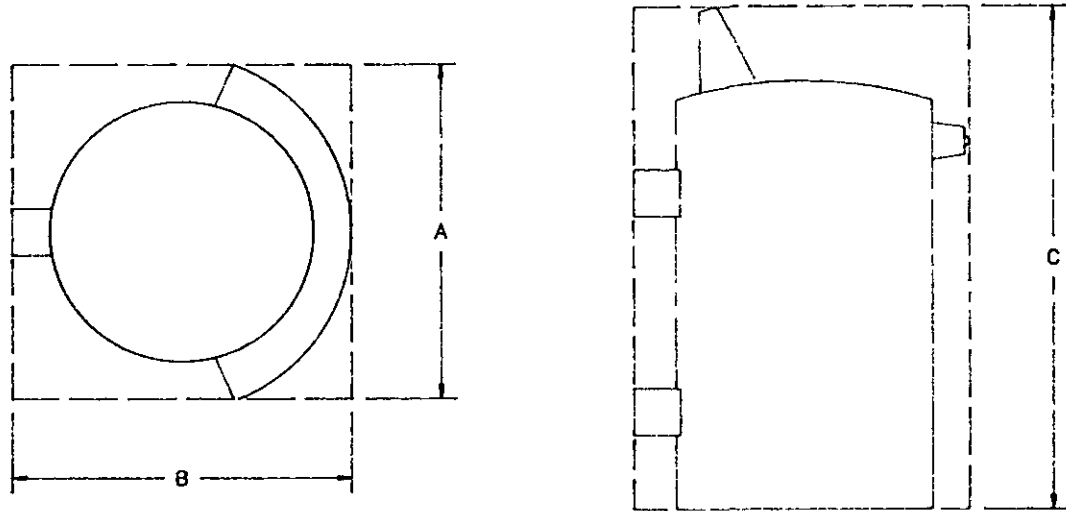
S refers to conventional

Internal refers to current limiting protection (see para 3 2 5 1)



kVa Rating	Thread Size	Min Length
25 to 75	0.625"-11 UNC-2A	1.25"
100 to 167	1.0"-14 UNC-2A	1.75"

Figure 1



MAXIMUM CLEARANCE DIMENSIONS*			
KVA	A	B	C**
75 and Below	27	33	44
100 and Above	36	36	50

* In Inches

** C dimension is to the top of the bushing well insert. (City provided)

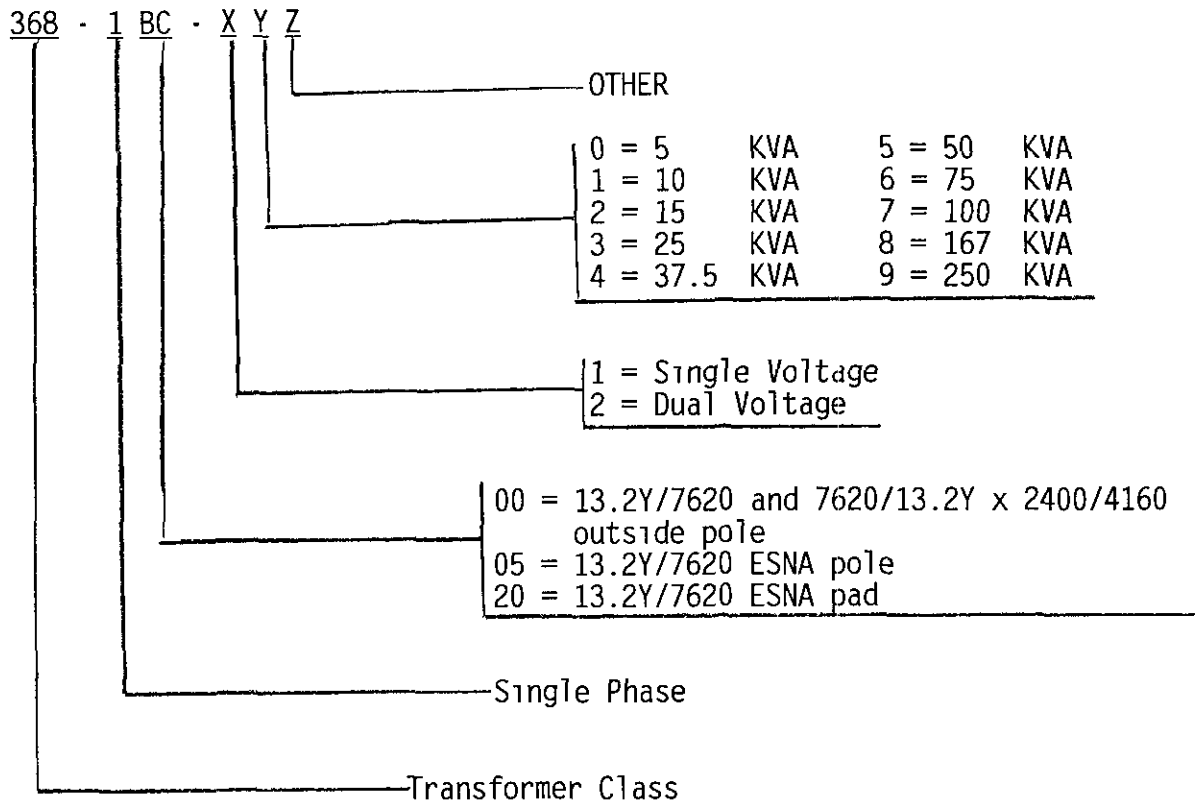
Figure 2

APPENDIX A

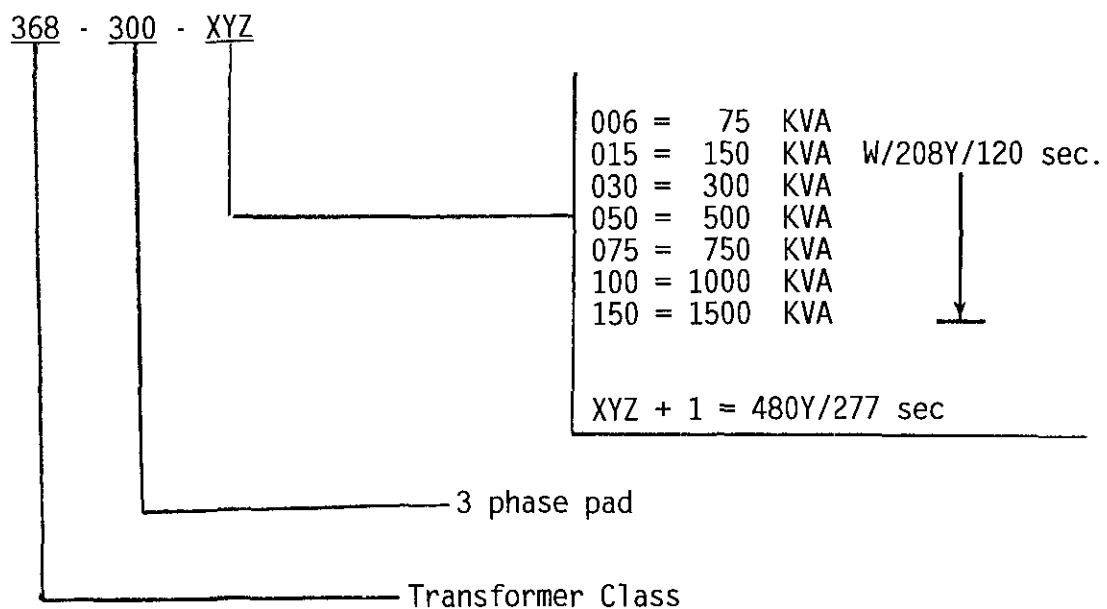
Figure 1A demonstrates the coding method used to establish City of Fort Collins Stock Numbers for transformers.

FIGURE 1A
TRANSFORMER STOCK NUMBER CODING

I. SINGLE PHASE



II. THREE PHASE



APPENDIX B

This Appendix is not intended to dictate requirements for items purchased under Specification 368-105, but is included as an aid in comparing coatings for those manufacturers attempting to meet the requirements of this design

Tank coatings listed here are for reference only and shall not be considered as complete. Also, the City of Fort Collins shall not be held responsible for patent infringements incurred through the use of this information.

- B.1 ARMORTEC, a fusion bonded vinyl resin having a minimum coating thickness of 15 mils
- B.2 Coal-tar Epoxy having a minimum thickness of 15 mils applied in two coats over a zinc rich primer and overcoated with flow coat applied black enamel paint
- B.3 Electrostatically applied thermosetting polyester applied as follows
 1. Five Stage Wash - alkaline detergent, water rinse, phosphate treatment, water rinse, and sealing rinse.
 2. Delay Line - dry and cool
 3. Coat - Electrostatically coat with a thermosetting polyester.
 4. Bake - Heat as recommended by polyester manufacturer to set polyester
 5. Cool.
 6. Repeat Process - Repeat applicable steps of above process to obtain a minimum dry build of 6 mils.
- B.4 Ceilcote FlakeLine 252 (minimum thickness 35 mils)

APPENDIX C

Transformers purchased under this Specification shall be of the make shown below. Manufacturers not listed below may submit written proposals demonstrating compliance with these Specifications for consideration of addition to the accepted manufacturers list prior to the next request for bids. In addition to inclusion on the list below, manufacturer's equipment must also satisfy all requirements of this Specification to be acceptable

<u>MANUFACTURER</u>	<u>SERIAL NO</u>
Cooper Power Systems	All except 196 & 195
Howard Industries	All
ABB	All

The manufacturers in the following list have been conditionally approved and may bid as an alternate. The definition and intent of "Conditional Approval" of a manufacturer is to allow the City to gain some experience with the manufacturer's product. Should a conditionally approved manufacturer be the evaluated low bidder, the City reserves the right to award all, part, or none of the order to them, dependant upon the current needs of the City for that item or items.

APPENDIX D

The following forms for Individual and Average Transformer Losses are used by the City of Fort Collins to determine loss penalties

- 1) Transformer Loss Evaluation Average Losses Form.
- 2) Individual Transformer Loss Evaluation Form.

TRANSFORMER LOSS EVALUATION

AVERAGE LOSSES

City Order No _____ S/N _____
 Manufacturer _____ Invoice No. _____
 KVA/Unit _____

<u>LINE</u>	<u>DESCRIPTION</u>	<u>AMOUNT</u>
(1)	No. of units	_____
(2)	Average core losses	_____
(3)	Quoted core losses	_____
(4)	Excess average core losses line (2) less line (3)	_____
(5)	Penalty for excess average core losses: line (1) x line (4) x \$ _____	_____
(6)	Average copper losses	_____
(7)	Quoted copper losses	_____
(8)	Excess average copper losses line (6) less line (7)	_____
(9)	Penalty for excess average copper losses: line (1) x line (8) x \$ _____	_____
(10)	Penalty to be assessed manufacturer line (5) plus line (9) but not less than zero	_____

Date _____ Prepared By: _____
 Design Engineering

NOTE: If any unit(s) exceeds the loss tolerances of ANSI C57.12 00, Light & Power will either reject it, include it on these averages, or calculate losses using the Individual Transformer Losses Evaluation Form, whichever is most favorable to Light and Power

INDIVIDUAL TRANSFORMER LOSS EVALUATION

City Order No _____ S/N _____
 Manufacturer _____ Invoice No. _____
 KVA/Unit _____

<u>LINE</u>	<u>DESCRIPTION</u>	<u>AMOUNT</u>
(1)	Tested core losses	_____
(2)	Quoted core losses	_____
(3)	Excess core losses line (1) less line (2) but not less than zero	_____
(4)	Percent difference $\text{line (3) - line (2) } \times 100$	_____
(5)	Tested total losses	_____
(6)	Quoted total losses	_____
(7)	Excess total losses line (5) less line (6) but not less than zero	_____
(8)	Percent difference $\text{line (7) } \div \text{line (6) } \times 100$	_____
(9)	Tested copper losses	_____
(10)	Quoted copper losses	_____
(11)	Excess copper losses line (9) less line (10) but not less than zero	_____
(12)	Penalty for excess core losses line (3) x \$ _____	_____
(13)	Penalty for excess copper losses line (11) x \$ _____	_____
(14)	Penalty to be assessed manufacturer line (12) plus line (13)	_____

Date _____ Prepared By: _____
 Design Engineering

Special Conditions and
Supplemental Instructions to Bidders
Applicable to Specification 368-105

A Data to be Supplied with Bidder's Proposal

The following data shall be supplied with the bidder's proposal in addition to that information required by the "Invitation to Bid" and the "Purchase Requisition"

- 1 Impedance volts in % at full load, high voltage to low voltage at 85°C
2. No load and total losses at 85°C
3. Protective tank coating specification
4. A statement indicating compliance with our Specification without exception
- 5 Escalation is _____, is not _____ applicable for the transformers bid. If escalation applies, the Bidder shall indicate in his bid the specific items or materials subject to escalation, and shall give the method and indices to be used in computing the amount thereof. Escalation occurring after the quoted delivery date will not be paid unless delays are the result of actions by the City. Escalation occurring after acceptance, if Purchaser exercises the option to delay shipment after manufacturing is completed, will not be paid.

Failure to supply the above data shall constitute a basis for rejection of the bid

B Loss Evaluations

Loss penalties and loss evaluations will be based on the following values

- 1 No load or excitation losses at \$3.90/watt
- 2 Load losses at \$1.50/watt

C Shipping Terms

Ship F O B point of destination, freight prepaid

D Terms of Payment

- 1 If escalation applies, the City of Fort Collins shall not be billed for escalation occurring after the promised delivery date. Escalation charges shall be itemized on the invoice.

2. Test reports shall accompany the invoice. If test reports do not accompany the invoice, late payment penalty charges incurred due to delays in obtaining the test reports will not be paid. Certified copies of test reports shall be sent to the Design Section, Fort Collins Light and Power Utility.
3. Loss penalty credits and escalation charges shall be itemized on the invoice.

**City of Fort Collins
Light and Power Department
Specification 368-110 - Revised 11-June-1999
Single Phase Submersible Cover Mount Transformer**

1 Scope

This specification and the accompanying drawing establishes the minimum requirements for an alternate design to City of Fort Collins Light and Power Specification 368-105 for single phase 60 hertz mineral oil filled self cooled vault type distribution transformers. The requirements of Specification 368-105 and applicable American National Standard requirements for distribution transformers shall apply except where specifically altered by this Specification.

2 Primary

- a 13,200 GRDY/7620, No Taps, Single Voltage
- b Radial feed (1- HV bushing)
- c ESNA long shank wells welded to tank
- d "NO" inserts provided

3 Secondary

- a 240/120, 3-wire (3-bushing LV pattern) (**exception to 368-105 Table I, cannot be banked for 3phase 208Y/120 service**)
- b X2 internally grounded (**clarification to 368-105 paragraph 3.2.4.2**)
- c Welded Central Moloney bushings with external epoxy (**dia. <1.38 see 368-105 Fig. 1**)
- d 5/8" threaded copper stud termination
- e Additive polarity

4 Electrical Requirements

- a Frequency 60 Hertz
- a KVA 25, 50, or 75 as requested
- b BIL 95 kV
- c Impedance Limits

KVA	Impedance
25	1.77% < %Z < 2.16%
50	1.77% < %Z < 2.16%
75	1.86% < %Z < 2.27%

5 Fusing (**exception to 368-105 Table I**)

- a Submersible type bayonet with overload dual sensing fuse element as shown below
- b RTE ELSP 8.3 kV under oil partial range current limiting fuse as shown below
- c "NO" low voltage under oil breaker

KVA	RTE Bayonet	RTE ELSP
25	358C05	40 amp 3543040M61M
50	358C08	80 amp 3543080M51M
75	358C10	125 amp 3543125M61M

City of Fort Collins
Light and Power Department
Specification 368-110 - Revised 11-June-1999
Single Phase Submersible Cover Mount Transformer

6 Tank Design

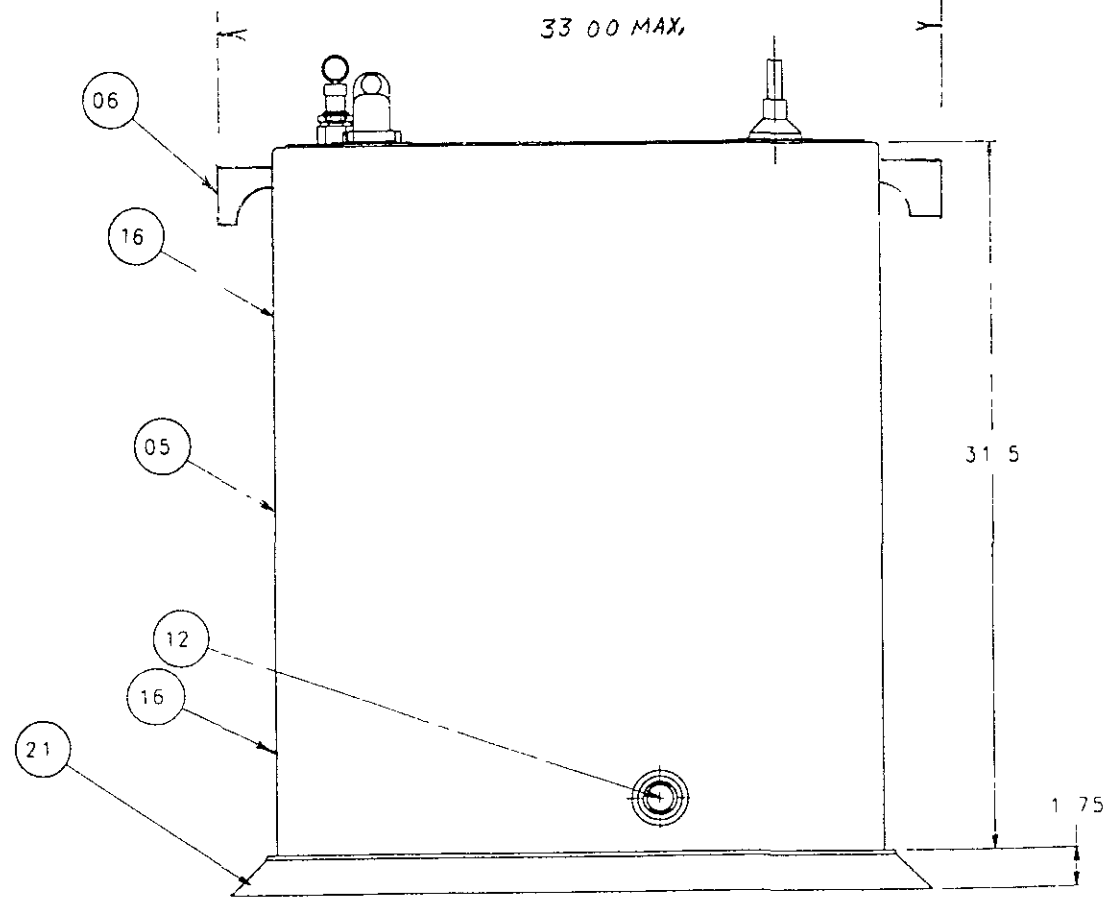
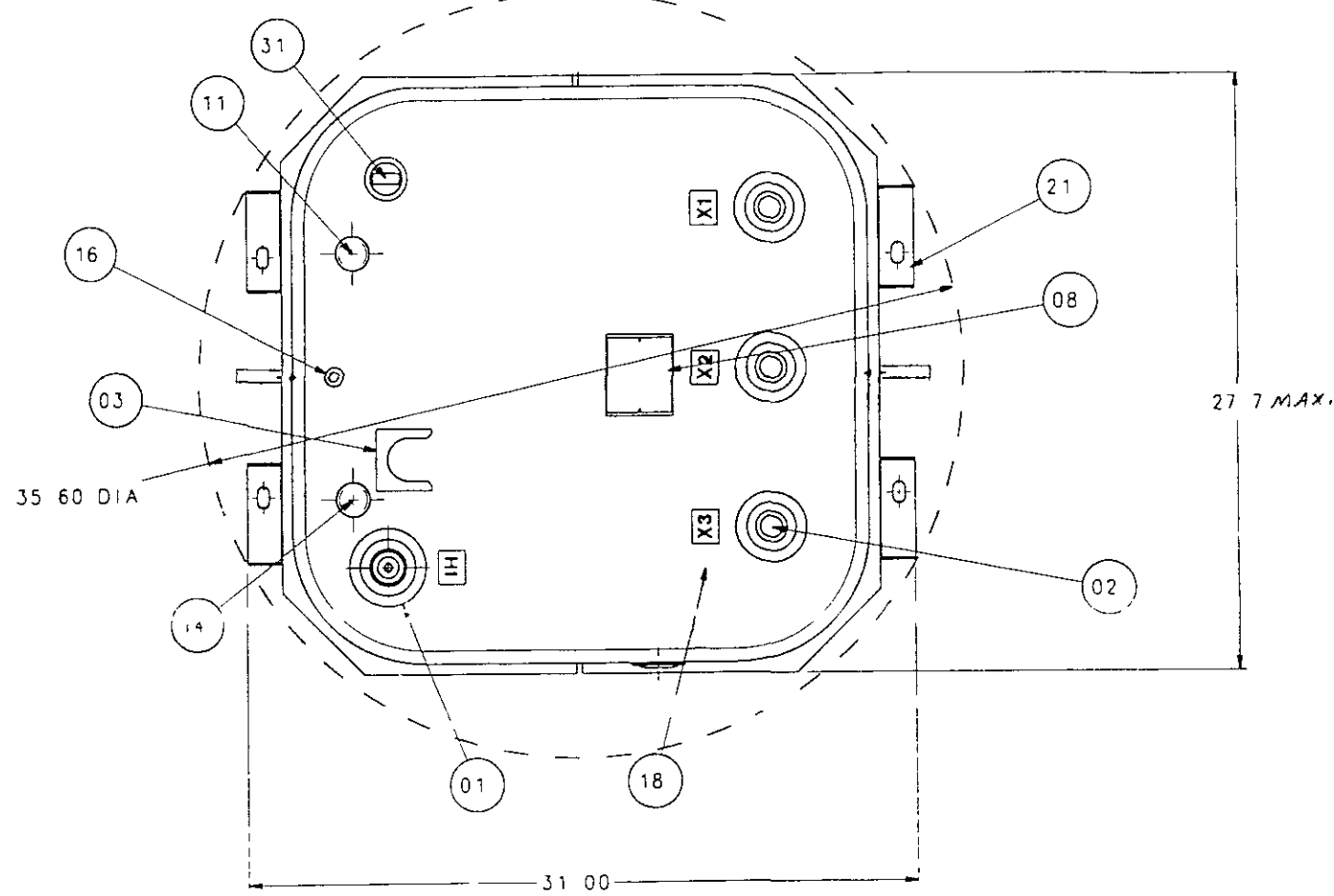
- a Tank material 105" (12 gauge) stainless steel (304 SST)
- b Tomko 1720K-1 pressure relief device located on cover
- c Tank drain 1 00" NPT flush coupling with brass pipe plug
- d (2) 1 00" NPT fill couplings located on cover with brass pipe plugs
- e (1) Tomko LG35 sight gauge/oil level coupling
- f (2) ½ - 13 SST ground pads centered on tank below primary bushing 7" from top and 7" from base respectively
- g (1) ½ - 13 SST ground pad on top near primary bushing
- h (1) SST loadbreak type parking stand
- i Cover to be welded to tank
- j Welded base runners
- k (2) Lifting hooks opposite each other welded on the front and back side of the tank near the top

7 Markings

- a X1, X2 & X3 SST identification tags with black lettering
- b "X2 Int Gnd" stenciled in black on cover
- c Bayonet warning decals located near bayonet fuse
- d SST nameplate in accordance with paragraph 3 2 5 6
- e Temporary serial/shipping card attached to tank lift-eye

8 Misc Design Issues

- a Cooling 65 Deg C AWR, average ambient 30 Deg C (55 Deg C AWR and 40 Deg C ambient)
- b Final color ASA 70 Gray
- c All exposed parts shall be constructed of corrosion resistant material, e g , SST, brass, or plastic
- d Two-way pallet with minimum width of 34"



- 01 HIGH VOLTAGE BUSHING WELL
- 02 LOW VOLTAGE BUSHING (5/8 - 13 UNC STUD)
- 03 SST PARKING STAND (LOADBREAK TYDPE)
- 05 STAINLESS STEEL TANK (304 SST)
- 06 LIFTING HOOK
- 08 SST NAMEPLATE
- 11 PRESSURE RELIEF DEVICE (TOMCO 1720K-1)
- 12 1 00 - NPT DRAIN PLUG
- 14 OIL LEVEL GAUGE (TOMCO LG35)
- 16 1/2 - 13 UNC SST GROUND PAD
- 18 SST I D TAGS FOR ALL BUSHINGS
- 21 TRANSFORMER SUPPORT RAILS
- 31 SUBMERSIBLE BAYONET IN SERIES WITH UNDER OIL PARTIAL RANGE CURRENT LIMITING FUSE

CITY OF FORT COLLINS, LIGHT AND POWER			
TITLE SINGLE PHASE VAULT TYPE TRANSFORMER			
DES 1PH SUBMERSIBLE, 1-HV, 3-LV, 13200 GRDY/7620 X 240/120, 25,50, &75 KVA			
DRAWING/SPECIFICATION NO 368-110			REV A
SCALE NTS	DRAWN BY TMS	APPD BY TMS	DATE 6/11/99

1 COMMERCIAL DETAILS

Invoice Address To ensure prompt Payment mail invoices in duplicate to
City of Fort Collins Accounting Division
P O Box 580
Fort Collins, CO 80522

Tax exemptions By statute the City of Fort Collins is exempt from state and local
taxes Our Exemption Number is 98-04502 Federal Excise Tax Exemption
Certificate of Registry 84-6000587 is registered with the Collector of Internal
Revenue, Denver, Colorado (Ref Colorado Revised Statutes 1973, Chapter
39-26, 114 (a))

Goods Rejected GOODS REJECTED due to failure to meet specifications, either
when shipped or due to defects of damage in transit, may be returned to you for
credit and are not to be replaced except upon receipt of written instructions from
the City of Fort Collins

Inspection GOODS are subject to the City of Fort Collins inspection on arrival

Final Acceptance Receipt of the merchandise, services or equipment in response
to this order can result in authorized payment on the part of the City of Fort
Collins However, it is to be understood that FINAL ACCEPTANCE is dependent
upon completion of all applicable required inspection procedures

Freight Terms Shipments must be F O B , City of Fort Collins, 700 Wood St ,
Fort Collins, CO 80522, unless otherwise specified on this order If permission
is given to prepay freight and charge separately, the original freight bill must
accompany invoice Additional charges for packing will not be accepted

Shipment Distance Where manufacturers have distributing points in various parts
of the country, shipment is expected from the nearest distribution point to
destination, and excess freight will be deducted from invoice when shipments are
made from greater distance

Permits Seller shall procure at sellers sole cost all necessary permits, certificates
and licenses required by all applicable laws, regulations, ordinances and rules of
the state, municipality, territory or political subdivision where the work is
performed, or required by any other duly constituted public authority having
jurisdiction over the work of vendor Seller further agrees to hold the City of Fort
Collins harmless from and against all liability and loss incurred by them by reason
of an asserted or established violation of any such laws, regulations, ordinances,
rules and requirements

Authorization All parties to this contract agree that the representatives are, in
fact, bona fide and possess full and complete authority to bind said parties
LIMITATION OF TERMS This Purchase Order expressly limits acceptance to the
terms and conditions stated herein set forth and any supplementary or additional
terms and conditions annexed hereto or incorporated herein by reference Any
additional or different terms and conditions proposed by seller are objected to and
hereby rejected

2 DELIVERY

PLEASE ADVISE PURCHASING AGENT immediately if you cannot make complete
shipment to arrive on your promised delivery date as noted Time is of the
essence Delivery and performance must be effected within the time stated on
the purchase order and the documents attached hereto No acts of the
Purchasers including, without limitation, acceptance of partial late deliveries, shall
operate as a waiver of this provision In the event of any delay, the Purchaser
shall have, in addition to other legal and equitable remedies, the option of placing
this order elsewhere and holding the Seller liable for damages However, the
Seller shall not be liable for damages as a result of delays due to causes not
reasonably foreseeable which are beyond its reasonable control and without its
fault of negligence, such acts of God, acts of civil or military authorities,
governmental priorities, fires, strikes, flood, epidemics, wars or riots provided
that notice of the conditions causing such delay is given to the Purchaser within
five (5) days of the time when the Seller first received knowledge thereof In the
event of any such delay, the date of delivery shall be extended for the period
equal to the time actually lost by reason of the delay

3 WARRANTY

The Seller warrants that all goods, articles, materials and work covered by this
order will conform with applicable drawings, specifications, samples and/or other
descriptions given, will be fit for the purposes intended, and performed with the
highest degree of care and competence in accordance with accepted standards
for work of a similar nature The Seller agrees to hold the purchaser harmless
from any loss, damage or expense which the Purchaser may suffer or incur on
account of the Sellers breach of warranty The Seller shall replace, repair or make
good, without cost to the purchaser, any defects or faults arising within one (1)
year or within such longer period of time as may be prescribed by law or by the
terms of any applicable warranty provided by the Seller after the date of
acceptance of the goods furnished hereunder (acceptance not to be unreasonably
delayed), resulting from imperfect or defective work done or materials furnished

by the Seller Acceptance or use of goods by the Purchaser shall not constitute
a waiver of any claim under this warranty Except as otherwise provided in this
purchase order, the Sellers liability hereunder shall extend to all damages
proximately caused by the breach of any of the foregoing warranties or
guarantees, but such liability shall in no event include loss of profits or loss of use
NO IMPLIED WARRANTY OR MERCHANTABILITY OR OF FITNESS FOR PURPOSES
SHALL APPLY

4 CHANGES IN LEGAL TERMS

The Purchaser may make changes to legal terms by written change order

5 CHANGES IN COMMERCIAL TERMS

The Purchaser may make any changes to the terms, other than legal terms,
including additions to or deletions from the quantities originally ordered in the
specifications or drawings, by verbal or written change order If any such change
affects the amount due or the time of performance hereunder, an equitable
adjustment shall be made

6 TERMINATIONS

The Purchaser may at any time by written change order, terminate this agreement
as to any or all portions of the goods then not shipped, subject to any equitable
adjustment between the parties as to any work or materials then in progress
provided that the Purchaser shall not be liable for any claims for anticipated profit
on the uncompleted portion of the goods and/or work, for incidental or
consequential damages, and that no such adjustment be made in favor of the
Seller with respect to any goods which are the Sellers standard stock No such
termination shall relieve the Purchaser or the Seller of any of their obligations as
to any goods delivered hereunder

7 CLAIMS FOR ADJUSTMENT

Any claim for adjustment must be asserted within thirty (30) days from the date
the change or termination is ordered

8 COMPLIANCE WITH LAW

The Seller warrants that all goods sold hereunder shall have been produced, sold
delivered and furnished in strict compliance with all applicable laws and
regulations to which the goods are subject The Seller shall execute and deliver
such documents as may be required to effect or evidence compliance All laws and
regulations required to be incorporated in agreements of this character are hereby
incorporated herein by this reference The Seller agrees to indemnify and hold the
Purchaser harmless from all costs and damages suffered by the Purchaser as a
result of the Sellers failure to comply with such law

9 ASSIGNMENT

Neither party shall assign, transfer, or convey this order, or any monies due or to
become due hereunder without the prior written consent of the other party

10 TITLE

The Seller warrants full, clear and unrestricted title to the Purchaser for all
equipment, materials, and items furnished in performance of this agreement, free
and clear of any and all liens, restrictions, reservations, security interest
encumbrances and claims of others

11 NONWAIVER

Failure of the Purchaser to insist upon strict performance of the terms and
conditions hereof, failure or delay to exercise any rights or remedies provided
herein or by law, failure to promptly notify the Seller in the event of a breach, the
acceptance of or payment for goods hereunder or approval of the design, shall not
release the Seller of any of the warranties or obligations of this purchase order and
shall not be deemed a waiver of any right of the purchaser to insist upon strict
performance hereof or any of its rights or remedies as to any such goods,
regardless of when shipped, received or accepted, as to any prior or subsequent
default hereunder, nor shall any purported oral modification or rescission of this
purchase order by the Purchaser operate as a waiver of any of the terms hereof

12 ASSIGNMENT OF ANTITRUST CLAIMS

Seller and the Purchaser recognize that in actual economic practice, overcharges resulting from antitrust violations are in fact borne by the Purchaser. Therefore, for good cause and as consideration for executing this purchase order, the Seller hereby assigns to the Purchaser any and all claims it may now have or hereafter acquired under federal or state antitrust laws for such overcharges relating to the particular goods or services purchased or acquired by the Purchaser pursuant to this purchase order.

13 PURCHASERS PERFORMANCE OF SELLERS OBLIGATIONS

If the Purchaser directs the Seller to correct nonconforming or defective goods by a date to be agreed upon by the Purchaser and the Seller, and the Seller thereafter indicates its inability or unwillingness to comply, the Purchaser may cause the work to be performed by the most expeditious means available to it, and the Seller shall pay all costs associated with such work.

The Seller shall release the Purchaser and its contractors of any tier from all liability and claims of any nature resulting from the performance of such work.

This release shall apply even in the event of fault or negligence of the party released and shall extend to the directors, officers and employees of such party.

The Seller's contractual obligations, including warranty, shall not be deemed to be reduced, in any way, because such work is performed or caused to be performed by the Purchaser.

14 PATENTS

Whenever the Seller is required to use any design, device, material or process covered by letter, patent, trademark or copyright, the Seller shall indemnify and save harmless the Purchaser from any and all claims for infringement by reason of the use of such patented design, device, material or process in connection with the contract, and shall indemnify the Purchaser for any cost, expense or damage which it may be obliged to pay by reason of such infringement at any time during the prosecution or after the completion of the work. In case said equipment, or any part thereof or the intended use of the goods, is in such suit held to constitute infringement and the use of said equipment or part is enjoined, the Seller shall, at its own expense and at its option, either procure for the Purchaser the right to continue using said equipment or parts, replace the same with substantially equal but non-infringing equipment, or modify it so it becomes non-infringing.

15 INSOLVENCY

If the Seller shall become insolvent or bankrupt, make an assignment for the benefit of creditors, appoint a receiver or trustee for any of the Seller's property or business, this order may forthwith be canceled by the Purchaser without liability.

16 GOVERNING LAW

The definitions of terms used or the interpretation of the agreement and the rights of all parties hereunder shall be construed under and governed by the laws of the State of Colorado, USA.

The following Additional Conditions apply only in cases where the Seller is to perform work hereunder, including the services of Seller's Representative(s), on the premises of others.

17 SELLERS RESPONSIBILITY

The Seller shall carry on said work at Seller's own risk until the same is fully completed and accepted, and shall, in case of any accident, destruction or injury to the work and/or materials before Seller's final completion and acceptance, complete the work at Seller's own expense and to the satisfaction of the Purchaser. When materials and equipment are furnished by others for installation or erection by the Seller, the Seller shall receive, unload, store and handle same at the site and become responsible therefor as though such materials and/or equipment were being furnished by the Seller under the order.

18 INSURANCE

The Seller shall, at his own expense, provide for the payment of workers compensation, including occupational disease benefits, to its employees employed on or in connection with the work covered by this purchase order, and/or to their dependents in accordance with the laws of the state in which the work is to be done. The Seller shall also carry comprehensive general liability including, but not limited to, contractual and automobile public liability insurance with bodily injury and death limits of at least \$300,000 for any one person, \$500,000 for any one accident and property damage limit per accident of \$400,000. The Seller shall likewise require his contractors, if any, to provide for such compensation and insurance. Before any of the Seller's or his contractors employees shall do any work upon the premises of others, the Seller shall furnish the Purchaser with a certificate that such compensation and insurance have been provided. Such certificates shall specify the date when such compensation and insurance have been provided. Such certificates shall specify the date when such compensation and insurance expires. The Seller agrees that such compensation and insurance shall be maintained until after the entire work is completed and accepted.

19 PROTECTION AGAINST ACCIDENTS AND DAMAGES

The Seller hereby assumes the entire responsibility and liability for any and all damage, loss or injury of any kind or nature whatsoever to persons or property caused by or resulting from the execution of the work provided for in this purchase order or in connection herewith. The Seller will indemnify and hold harmless the Purchaser and any or all of the Purchaser's officers, agents and employees from and against any and all claims, losses, damages, charges or expenses, whether direct or indirect, and whether to persons or property to which the Purchaser may be put or subject by reason of any act, action, neglect, omission or default on the part of the Seller, any of his contractors, or any of the Seller's or contractors officers, agents or employees. In case any suit or other proceedings shall be brought against the Purchaser, or its officers, agents or employees at any time on account or by reason of any act, action, neglect, omission or default of the Seller or any of his contractors or any of its or their officers, agents or employees as aforesaid, the Seller hereby agrees to assume the defense thereof and to defend the same at the Seller's own expense, to pay any and all costs, charges, attorneys fees and other expenses, any and all judgment that may be incurred by or obtained against the Purchaser or any of its or their officers, agents or employees in such suits or other proceedings, and in case judgment or other lien be placed upon or obtained against the property of the Purchaser, or said parties in or as a result of such suits or other proceedings, the Seller will at once cause the same to be dissolved and discharged by giving bond or otherwise. The Seller and his contractors shall take all safety precautions, furnish and install all guards necessary for the prevention of accidents, comply with all laws and regulations with regard to safety including, but without limitation, the Occupational Safety and Health Act of 1970 and all rules and regulations issued pursuant thereto.

9/90
Revised 11/91