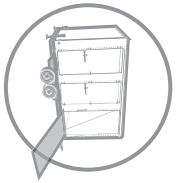
TCM AIR-CELL OPERATIONS MANUAL

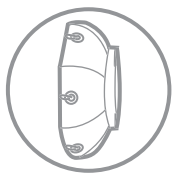


Emergency Response

Environmental

Remote Site

Dragon



Fireflex

Bambi Bucket

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Section 1: TCM Air-Cell Manual

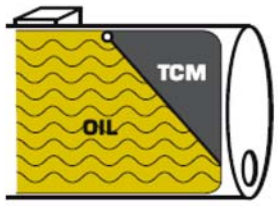
Overview

Description of the TCM Air-Cell

SEI Industries has specifically engineered the TCM Air-Cell for the electrical utility industry and is designed to be used inside a membrane-type conservator.

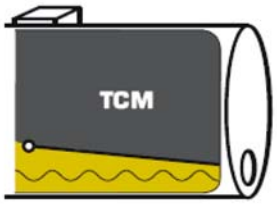
The TCM Air-Cell acts as a barrier to ensure undesirable elements in the atmosphere, such as water vapour and oxygen, do not contaminate the transformer oil within a conservator. This barrier also reduces condensation and oxidation inside the transformer and suppresses gas bubble formation in the transformer oil.

The TCM Air-Cell floats on oil inside the conservator. It expands and contracts by breathing through a flange placed in a customer-specified location, thus allowing the TCM Air-Cell to compensate for oil displacement due to temperature variations in the transformer.



When oil inside the conservator is at a high temperature, the TCM deflates.

Conversely, when oil is at a low temperature, the TCM inflates with air.



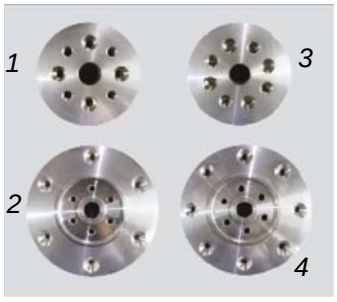
Fabric of the TCM Air-Cell

TCM Air-Cells are constructed from a 30 oz. (1017 g/m2) urethane-coated nylon fabric that has been specifically designed to be compatible with transformer oils, silicon fluids and bio-degradable transformer oils. The fabric is highly abrasion resistant, suitable for high temperatures and is extremely flexible, ensuring a long-term airtight barrier.

Design of the TCM Air-Cell

SEI offers a selection of standard sizes to meet a variety of conservator oil volume levels. Each TCM Air-Cell is designed to meet ANSI/IEEE C-57.12.80-1978. Sec: 6.5.5 standard.

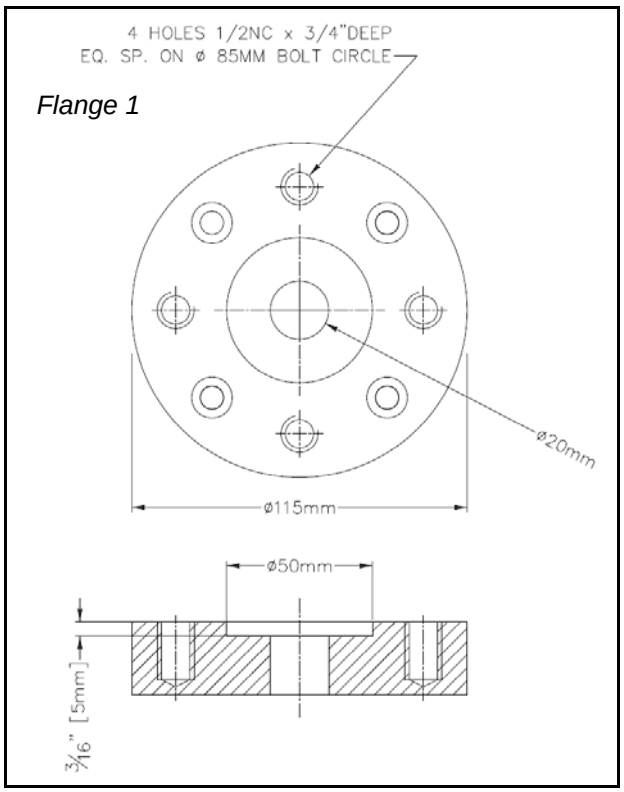
All seams are radio frequency welded and tested to insure seam strength and a long-term airtight barrier. A flange is inserted into each TCM Air-Cell. The flange provides a point of entry allowing the TCM to act as a breather. Flanges can be located anywhere on the Air-Cell to match conservator tank design. SEI offers standard machined aluminium flanges.

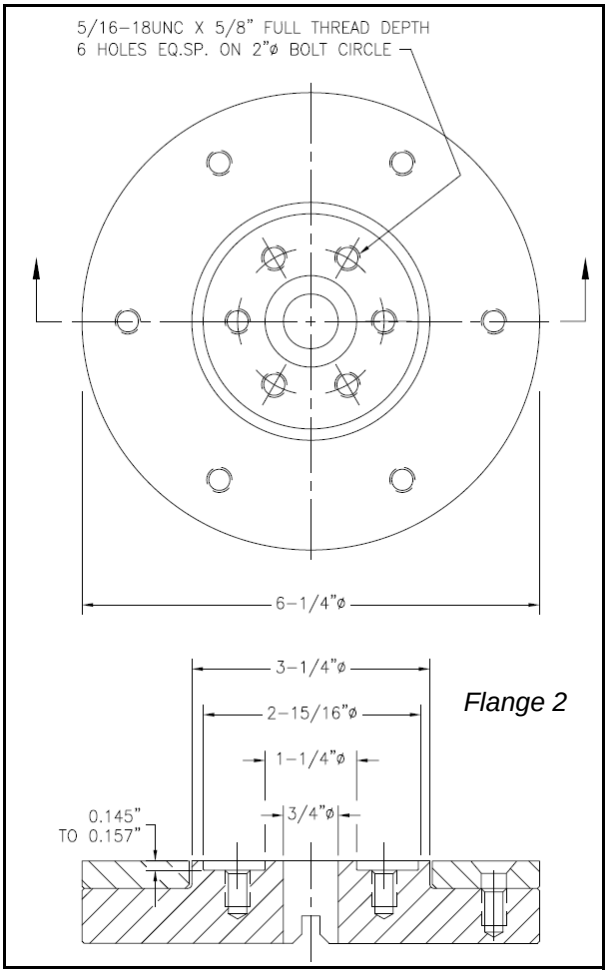


Standard flanges (see drawings below for more info).

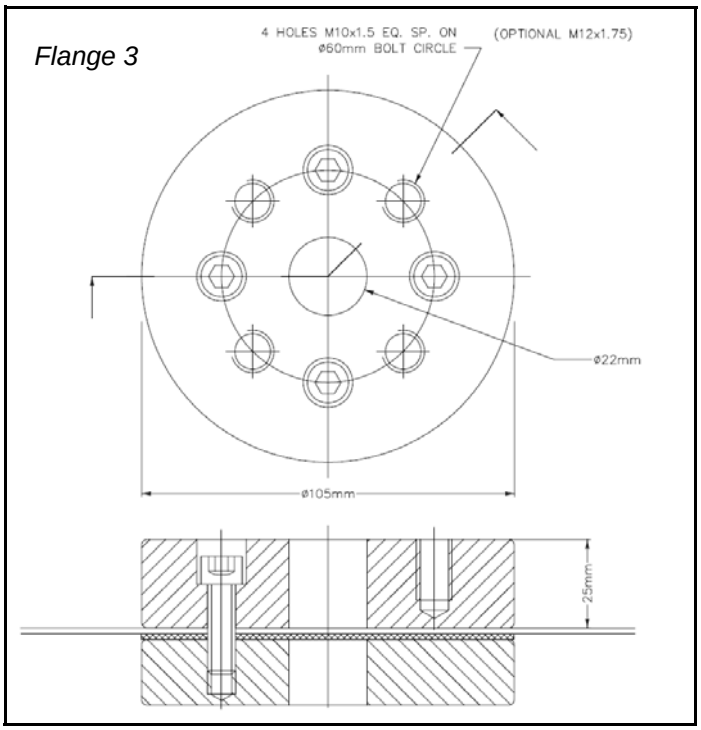
Flange Options

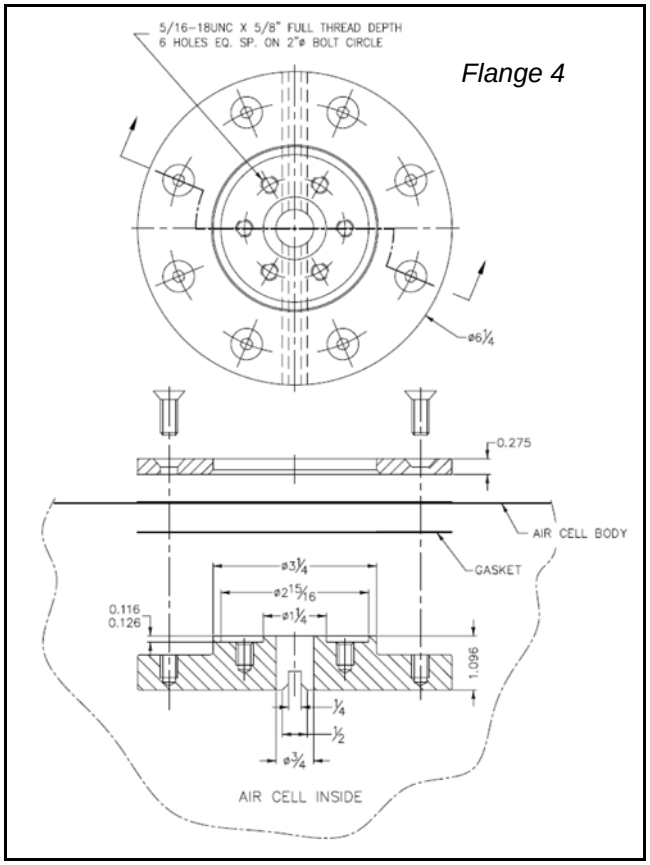
SEI Industries will custom fabricate each TCM Air-Cell exactly to customer specifications and, depending on customer needs, different flange designs are available upon request. The four diagrams below and on the next page represent the standard flanges in stock.





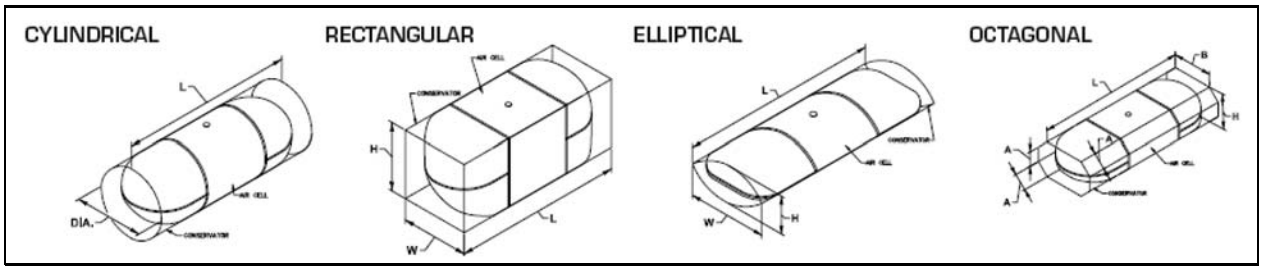
Flange 3


4 HOLES M10x1.5 EQ. SP. ON
ø60mm BOLT CIRCLE
(OPTIONAL M12x1.75)
ø22mm
ø105mm
25mm


5/16-18UNC X 5/8" FULL THREAD DEPTH
6 HOLES EQ. SP. ON 2"ø BOLT CIRCLE
Flange 4
ø6¼
0.275
AIR CELL BODY
GASKET
ø3¼
ø2 15/16
ø1¼
0.116
0.126
1.096
¼
½
ø¾
AIR CELL INSIDE

Shape Options

TCM Air-Cell may be cylindrical, rectangular, elliptical or octagonal shaped depending on your specific conservator shape. Please include the dimensions required when placing an order.



Handle Options

The TCM Air-Cell may come complete with optional handles or loops as specified by the client. These handles or loops are also used to secure the Air-Cell to the conservator tank. The handles/loops are made from transformer oil-resistant materials.

SEI will place the handles/loops according to conservator tank design. Reinforced patches are placed around the flange and handles to provide extra wear protection. Each TCM Air-Cell is individually marked for identification to enable easy inventory tracking.

Handles and loops are optional.

Section 2: Standard Equipment

Equipment List

Each TCM comes complete with the following equipment:

- A flange that can be secured to the flange found on the conservator tank. The flange may be a standard six bolt pattern or custom depending on customer specification.
- Reinforcement patches placed around and under flanges; extra wear patches may be present if requested by the customer to protect the tank from oil pressure gauges.
- Identification serial number stamped on the flange.
- A quality certificate that indicates the date of manufacture, serial number and customer model number.
- A manufacture identification patch that provides contact information in the event that a replacement TCM is required.
- As per customer requests, loops/handles or securing tabs are provided to secure the TCM bag to the conservator tank during installation.

Each TCM is designed to meet ANSI/IEEE C-57.12.80-1978. Sec:6:5:5 Standard.

Section 3: Installation

Installation Procedure

Important Note

To prevent your TCM bag from damage during installation, please ensure the inside of the conservator tank has a smooth finish without sharp welding edges.

Installation Method

The following steps are one possible way to ensure that a TCM is installed correctly. This method will create a flat bottom which will ensure an accurate oil level gauge reading. Other methods may also be used.

1. Place ground sheet (paper, cardboard or material) on the ground to protect the bottom of the TCM from possible hazards.

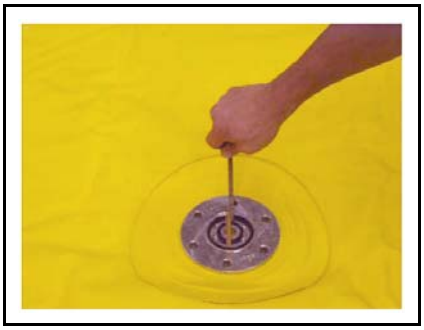
2. Open the shipping carton and remove the TCM and protective wrapping bag.

3. Position TCM bag on the ground sheet in the same direction it will be installed in the conservator tank.

4. Remove identification tag from the TCM handle.

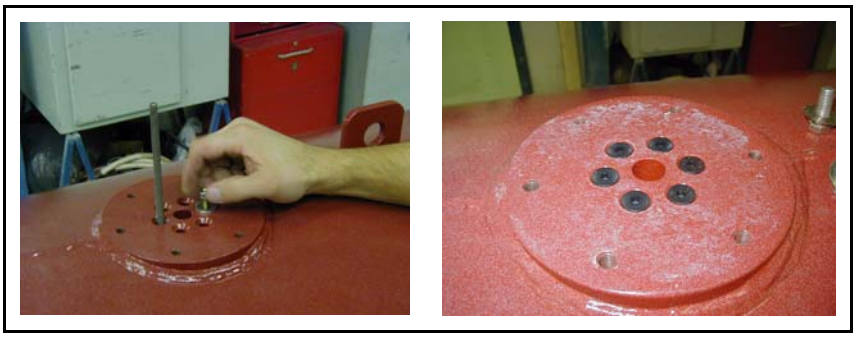
5. Place the O-rings or gasket on the TCM flange.

6. Place two tapped pilot rods into the TCM flange. They will be used to position the TCM and secure the TCM flange to the conservator flange.



7. Position the TCM inside the conservator tank and secure the handles to support rod or hooks. Use Terylene cord if required.

8. Attach the TCM flange to the conservator flange and secure.

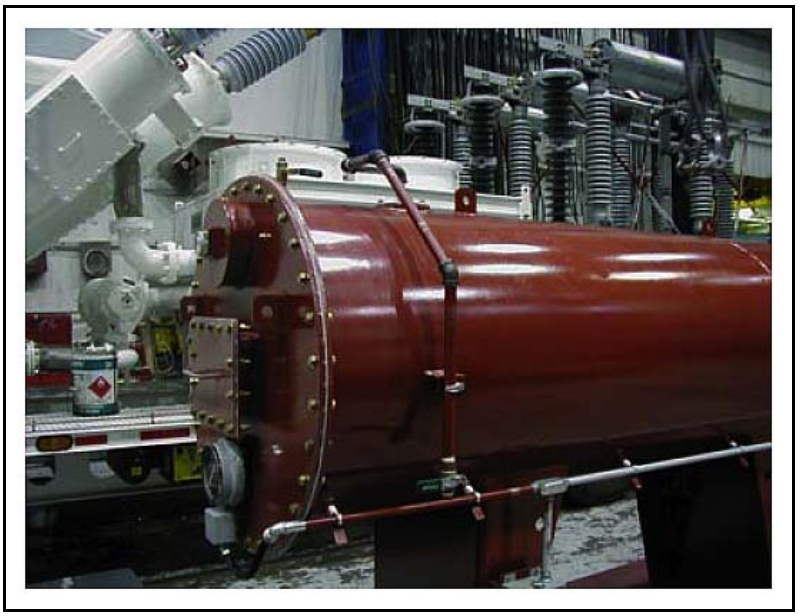


9. Close the conservator and inflate the TCM. Refer to the TCM Certificate of Quality provided with each TCM to obtain the testing pressure (psi) rate. Do not inflate any TCM past 1 psi or beyond the testing pressure rate detailed on the TCM Certificate of Quality.

Warning

Do not inflate any TCM past 1 psi or beyond the testing pressure rate detailed on the TCM Certificate of Quality.

10. Fill the conservator with oil until all air is evacuated from the conservator. Oil should be flowing from the conservator bleeder valves when the air has completely evacuated the conservator. Close the conservator bleeder valves while the TCM is still inflated.



11. Slowly release the pressure from the TCM air-cell and continue filling the conservator with transformer oil until the oil reaches the operating level. The oil will force the air out of the TCM.

12. Once the oil has reached operating level, open the TCM to atmospheric pressure.

Sample Certificate of Quality

TCM Certificate of Quality

DATE : _____

Dear Customer:

Thank you for choosing SEI industries Ltd. As your Flexible Transformer Air-Cell Conservator supplier.
We take exceptional pride in the workmanship and quality of each Flexible Transformer Air-Cell Conservator we make.

This Flexible Transformer Air-Cell Conservator has been tested in accordance with JWI1750-001 Air Testing Air-Cell Standard Test Procedures and Acceptance Criteria, of the SEI Industries Ltd., ISO 9001-2008 Quality Management System and has passed.

Sales Order #	*000*
PO #	*0*
SEI Serial #	*TCM0*
Customer Part #	*0*
Customer Job #	*0*
Flat Dimensions	
Testing Pressure	*0.00 PSI*
Inspector	

WARNING
If customers choose to air-test TCM, do not exceed test pressure listed above as it may damage the tank and void warranty

We look forward to serving you again.

_____
***Sun Mudaliar** Senior Production Supervisor*
SEI Industries Ltd. 7400 Wilson Avenue, Delta, BC, Canada
T: 604.946.3131 E: seisales@sei-ind.com
www.sei-ind.com

TCM Certificate Rev.6

Section 4: Warranty

a) Warranty is limited to repairing or replacing, at the company's sole discretion, any product approved to be defective.

b) The company's products are not guaranteed for any specific length of time or measure of service, but are warranted only to be free from defects in workmanship and material for a period of one year to the original purchaser.

c) To the extent allowable under applicable law, the company's liability for consequential, incidental and environmental damages is expressly disclaimed. **The company's liability in all events is limited to and shall not exceed, the purchase price paid.**

d) This warranty is granted to the original purchaser and does not extend to a subsequent purchaser or assignee.

e) The company must receive notification in writing of any claims of warranty from the original purchaser which must give details of the claimed defect in the product.

f) Where the original purchaser is claiming under warranty, the product must be returned to the company for inspection with all transportation and duty charges prepaid.

g) The warranty does not extend to any product that has been accidentally damaged, abraded, altered, punctured, abused, misused or used for a purpose which has not been approved by the company.

h) This warranty does not apply to any accessories used with the product such as pumps, filters, hoses, etc., that are not supplied by the company, and any warranty on such accessories must be requested from the manufacturer or dealer of the accessories.

i) In the event the original purchaser does not give notice of a warranty claim within one year of the original purchase of the product, it is understood that the purchaser has waived the claim for warranty and the purchaser and/or any subsequent purchaser must accept the condition of the product as it may be, without warranty.

j) Any technical information supplied by the company regarding the product is not a condition of warranty but rather is information provided by the company to the best of its knowledge.

k) There are no implied warranties nor is there any warranty that can be assumed from any representation of any person, except the company itself.

Exclusions

This warranty is void if the product is not assembled, used and/or maintained in accordance with the operator's manual supplied by SEI.