



Global technology for local needs

AIRCELL

FOR OIL FILLED TRANSFORMERS



AIRCELL

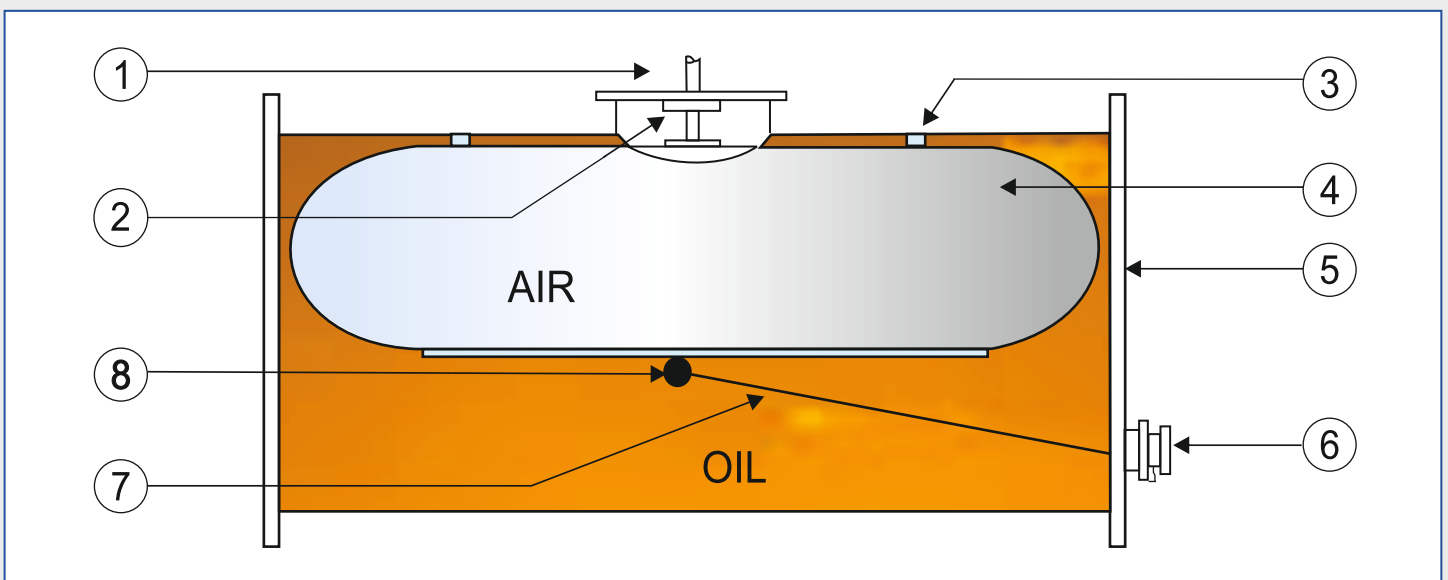
OVERVIEW

The Air Cell (Flexible Separator) is fitted inside a conservator tank, isolating insulating oil from the atmosphere, and thus preventing contamination of gas and/or moisture from coming in to contact with the transformer oil due to oxidation and hydrolysis. The bag is vented on the transformer through flange type mounting such that it inflates or deflates to accommodate oil volume displacements due to changes in the transformer temperature.

The Air Cells are manufactured using time tested combination of Nylon (Polyamide) fabric and thick coating of Elastomers i.e. Acrylonitrile Butadiene Rubber (NBR), Polychloroprene (CR) and Hypalon (CSM). The rubber compounds are so formulated, so as to minimize separator degradation and resist leakage of air through membranes thus reducing the amount of air in the transformer oil. Over a period of time this air/gases can reduce dielectric strength and thereby accelerate the aging of the insulation system.

The advantages of the Air-Cell can be well concluded from the facts :

- Simple design with no expandable parts
- Needs negligible man hours for inspection
- Extended service life
- Economical
- Prevents corrosion
- Oil can be filled into the transformer tank without being exposed to the air
- Since insulating oil is completely isolated from the atmosphere by an air cell, there is no Possibility of oxygen or moisture penetrating the oil
- Pressure on the surface of the oil is constantly maintained at the atmospheric pressure, offering no possibility of the oil becoming supersaturated and forming bubbles; thus, high dielectric strength can be maintained



- | | |
|-----------------------------|------------------------|
| 1. Connecting Flange | 5. Conservator |
| 2. Pipe Connecting Breather | 6. Oil Level Indicator |
| 3. Straps | 7. Float Arm |
| 4. Aircell | 8. Float |



THE TECHNOLOGY

The product design and construction of **Aircell** is based on thorough analysis of the stringent and diverse environments in which they have to perform. Their constitution takes into account the various factors that affect the performance over long periods of operation. The Air Cell we manufacture incorporates the latest coating technology.

Some of the most important features that make SUKRUT Aircell exclusive are :

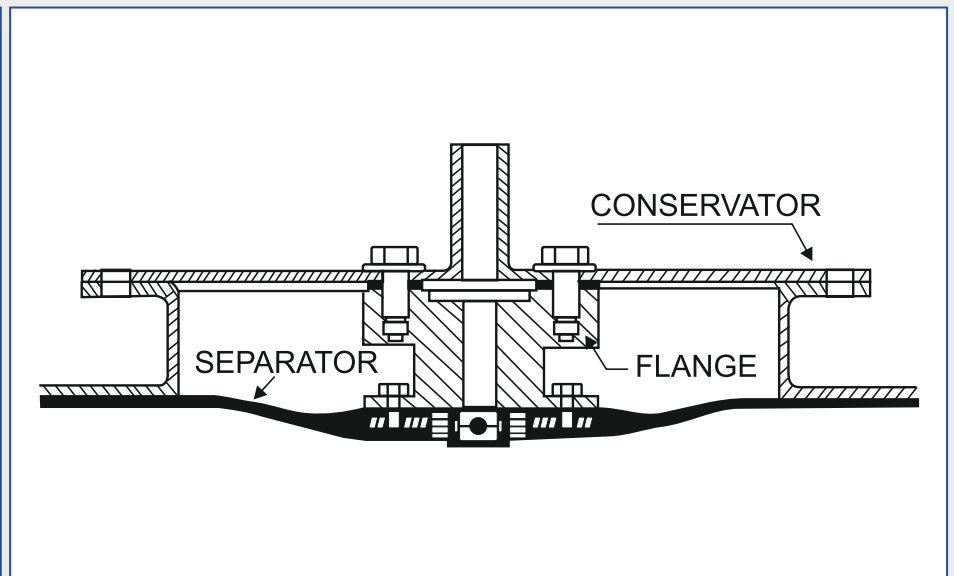
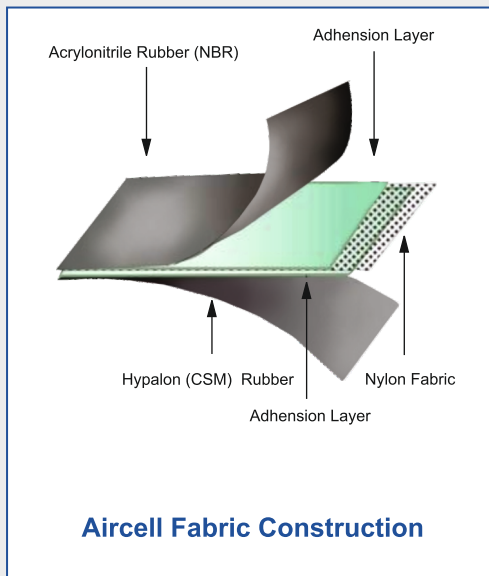
The Polyamide Substrate :

The textile reinforced supporting fabric is made from high tenacity Nylon yarns and designed specifically for flexible Separators. The fabric has high tear & tensile strength, high flexibility & fatigue resistance and superior dimensional stability.

The Polymer Technology :

Air Cells are manufactured by using combination of various Elastomers. The inside of the fabric is coated with combination of Olive Green-Hypalon (CSM) & Black- Polychloroprene(CR) for imparting better ozone resistance. Whereas the outer side is coated with Black-Acrylonitrile Butadiene Rubber (NBR) for providing better oil resistance. The compounds are carefully formulated to accommodate critical technical parameters such as:

- High bonding strength between rubber to fabric
- Improved temperature and ozone resistance
- Good swell and chemical resistance to transformer oil
- Crack and weathering resistance



The Coating Technology :

Our Aircells are manufactured using sophisticated manufacturing facility to produce rubber coated fabrics, which are roto-cured under automatically controlled time, pressure and temperature. This distinctively offers advantages such as:

- Higher bond strength between the polymer and fabric substrate
- Hot vulcanised seams to ensure no leakage at all times
- Guaranteed mechanical strength to fixation lugs
- Smooth glossy surface free of pin-holes and defects due to rotocuring
- Superior thickness control under tolerance of ± 0.05 mm giving greater dimensional stability.



AIRCELL

TESTS

Routine Tests

Basic Fabric :

1. Visual Inspection for Knots & Holes
2. Breaking Strength
3. Elongation

Coated Fabric :

1. Air permeability
2. Visual Inspection for Pin-holes
3. Mass Surface
4. Thickness
5. Swelling
6. Tear Strength
7. Breaking Strength
8. Elongation
9. Adhesion

Finished Product :

1. Pressure Testing by Compressed Air
2. Leakage Testing with Soap Solution
3. Puncture Testing
1. Heat Aging
2. Compression Test
3. Low Temperature Flexibility
4. Sludge Content
5. Acidity
6. Ozone Resistance
7. Air Permeability

Test Certificates can be provided upon request

Faults & Remedies

Air Cell is manufactured considering all aspects of application during its use in the transformers. In the normal course of use, careful handling, storing and fitting of the Aircell will give a good service life.

However in the event of mishandling or accident the fabric can get ruptured or the joint may open, leading to leakage of air in the conservator.

For minor repairs, a kit with working instructions is provided along with each air cell. For major damage the Aircell will have to be returned to our manufacturing facility.

The serial Number of Aircell must be informed when any observation is to be communicated to us.

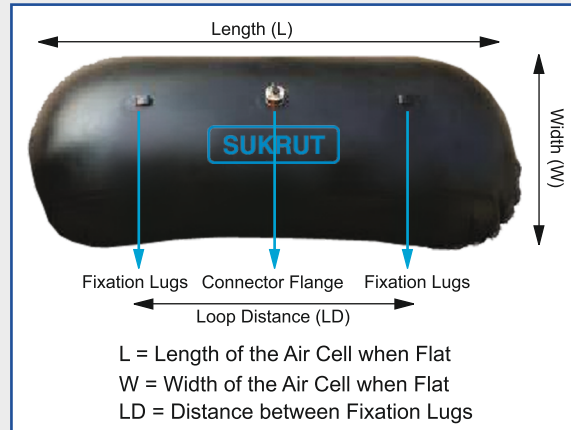
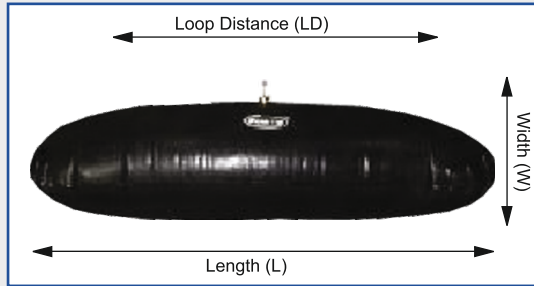
Please note that it will not be possible to depute our representative to site to access / inspect the damage / fault.



AIRCELL

DIMENSIONS & SIZES

Dimensions :



SR. NO.	F S P SIZE	EXPANSION VOLUME	CONSERVATOR SIZE			SEPARATOR SIZE		
			Dia	Length	Volume	Width	Length	Loop Dist
		(Litres)	A (mm)	B (mm)	(Litres)	W (mm)	L (mm)	LD (mm)
1	500 - 500	500	500	2710	530	825	3035	2010
2	500 - 600	500	600	1970	560	982	2352	1170
3	750 - 600	750	600	2850	810	982	3232	2050
4	750 - 700	750	700	2180	840	1140	2620	1280
5	1000 - 700	1000	700	2830	1090	1140	3270	1930
6	1000 - 800	1000	800	2167	1088	1290	2657	1167
7	1000 - 800	1000	800	2260	1130	1297	2757	1260
8	1500 - 800	1500	800	3250	1630	1297	3747	2250
9	1500 - 900	1500	900	2660	1690	1454	3214	1560
10	2000 - 900	2000	900	3440	2190	1454	3994	2340
11	2000 - 1000	2000	1000	2400	1884	1610	3010	1200
12	2000 - 1000	2000	1000	2990	2347	1610	3600	1790
13	2500 - 1000	2500	1000	3300	2590	1610	3910	2100
14	2500 - 1000	2500	1000	3400	2669	1610	4010	2200
15	2500 - 1000	2500	1000	3540	2779	1610	4150	2340
16	3000 - 1000	3000	1000	3800	2983	1610	4410	2600
17	2000 - 1000	2000	1000	2880	2260	1611	3491	1680
18	2500 - 1000	2500	1000	3520	2760	1611	4131	2320
19	3500 - 1000	3500	1000	4740	3721	1611	5351	3540
20	2500 - 1100	2500	1100	3000	2850	1768	3668	1700
21	3000 - 1100	3000	1100	3520	3350	1768	4188	2220
22	3000 - 1200	3000	1200	3050	3450	1925	3775	1650
23	4000 - 1200	4000	1200	3940	4450	1925	4665	2540
24	3500 - 1200	3500	1300	2800	3715	2082	3582	1300
25	4000 - 1300	4000	1300	3450	4580	2082	4232	1950
26	4500 - 1300	4500	1300	3600	4775	2082	4382	2100
27	5000 - 1300	5000	1300	4000	5306	2082	4782	2500
28	5000 - 1300	5000	1300	4200	5580	2082	4982	2700
29	6000 - 1300	6000	1300	4770	6328	2082	5552	3270
30	8000 - 1300	8000	1300	6520	8650	2082	7302	5020
31	3000 - 1300	3000	1300	2512	3332	2100	3300	1110
32	5000 - 1400	5000	1400	3710	5720	2239	4549	2110
33	6000 - 1400	6000	1400	4360	6720	2239	5199	2760
34	6000 - 1400	6000	1400	5000	6633	2240	5840	3400
35	6000 - 1500	6000	1500	3900	6880	2396	4796	2200



AIRCELL

HOW TO ORDER

CYLINDRICAL CONSERVATOR

L(mm) = Length of conservator + W - Diameter of conservator

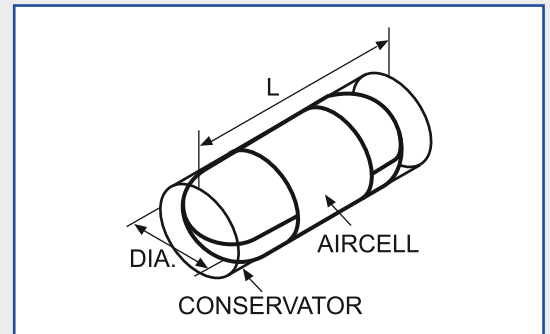
$$W \text{ (mm)} = \frac{TT \times \text{Conservator diameter}}{2} + 40 \text{ mm}$$

LD (mm) = L - W - 200 mm

L: flat (fully deflated) length of the STP

W : flat (fully deflated) width of the STP

LD : pitch distance of lugs



RECTANGULAR CONSERVATOR

L(mm) = Length of conservator + 40 mm

W (mm) = width of the conservator + H+ 40 mm

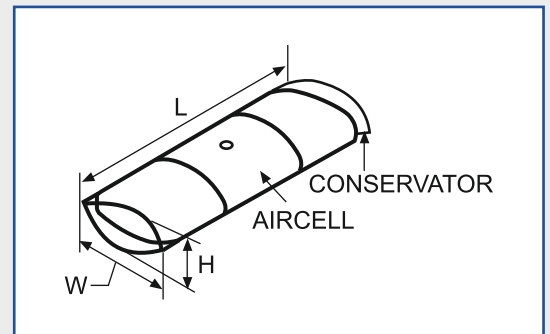
$$LD \text{ (mm)} = x - \frac{(H \times TT)}{2} - 200 \text{ mm}$$

L: flat (fully deflated) length of the STP

LD: pitch distance of lugs

W: flat (fully deflated) width of the STP

H: conservator height



ELLIPTICAL CONSERVATOR

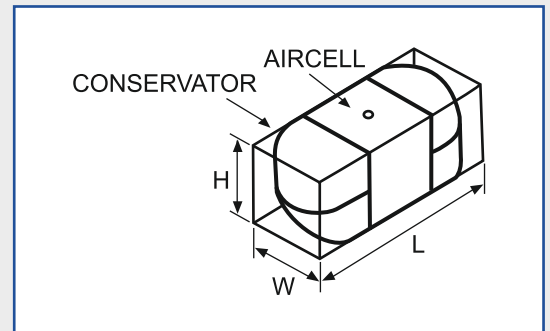
L(mm) = Length of conservator + 40 mm

W (mm) = 1/2 developed length of the conservator)

$$LD \text{ (mm)} = x - \frac{(H \times TT)}{2} - 200 \text{ mm}$$

L: flat (fully deflated) length of the STP

LD: pitch distance of lugs



RECTANGULAR CONSERVATOR

L(mm) = Length of conservator + 40 mm

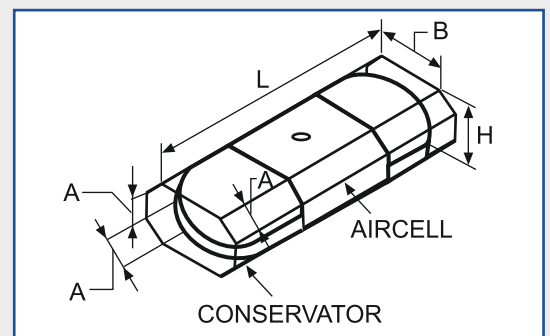
W (mm) = width of the conservator + H+ 40 mm

$$LD \text{ (mm)} = x - \frac{(H \times TT)}{2} - 200 \text{ mm}$$

L: flat (fully deflated) length of the STP

LD: pitch distance of lugs W: flat (fully deflated) width of the STP

H: conservator height



CUSTOMER SPECIAL REQUEST CONSERVATOR

L (mm) = Length of conservator + 40 mm

$$W \text{ (mm)} = \frac{A+2XB+c}{2}$$

LD (mm) = x - (H x TT) - 200 mm

W: flat (fully deflated) width of the STP

H: conservator height

Your requirements can be specified by giving dimensions **L, W & LD**

Other Conservator Shapes Available On **REQUEST**



AIRCELL

INSTALLATION OF THE AIR CELL

Step 1

Push the Air Cell into the conservator through the open end or inspection hatch in the end of the conservator.

Step 2

Suspend the Air Cell from hooks (2) in the ceiling of the conservator using the loops.

Step 3

Fit the Air Cell flange (8) on the conservator flange using a ring (7) to ensure air tightness of the system.

Step 4

Close the open end of the conservator.

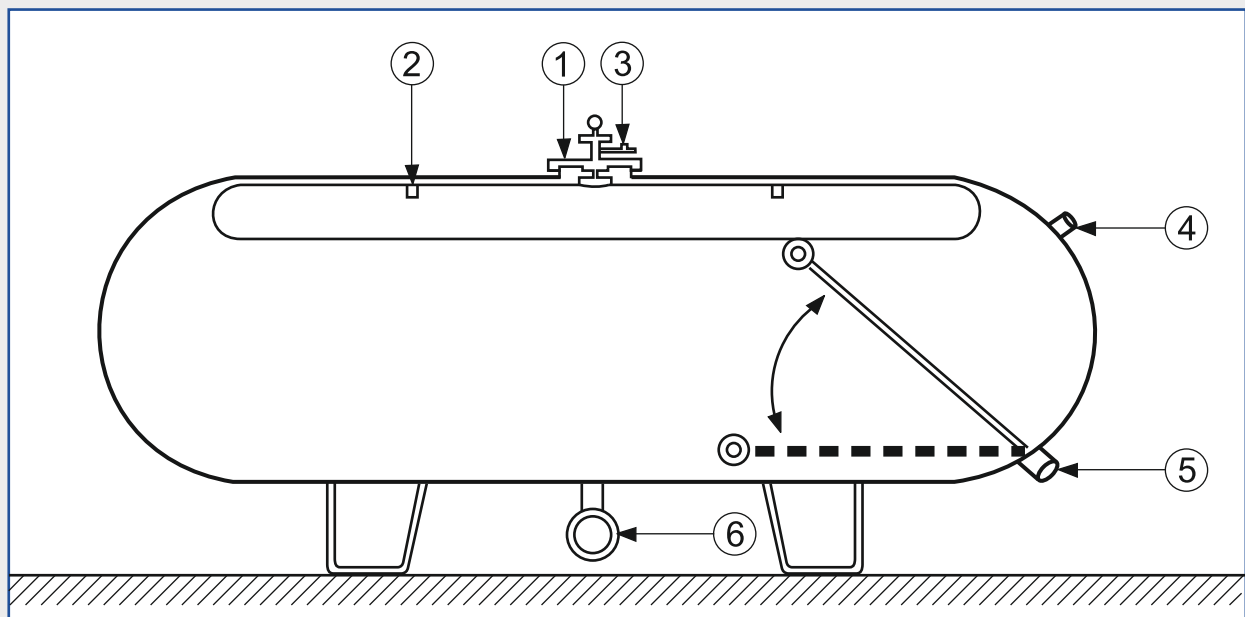
Step 5

Fill the Air Cell to a pressure of 10kPa (0.1 bar). Close the filling valve (3) while leaving the system pressurized. A relief hole (4) must be on the oil filled side of the conservator so that the Air Cell can freely expand.

Step 6

The Air Cell will gradually stabilize. After 6 hours, adjust the air pressure again to 10kPa (0.1 bar). A 24 hours leak test is then to be made on the Air Cell. After 24 hours check the pressure reading again.

If the pressure has not dropped significantly, the test is correct. The temperature should be as stable as possible during the leakage testing period.



AIRCELL

FILLING THE CONSERVATOR

Step 1

The pressure of air in the Aircell should be 10kPa (0.1 bar). If not, increase the pressure to the correct level and close the air-filling valve.

Step 2

Check the air vent valves (4) are open at both ends of the conservator.

Step 3

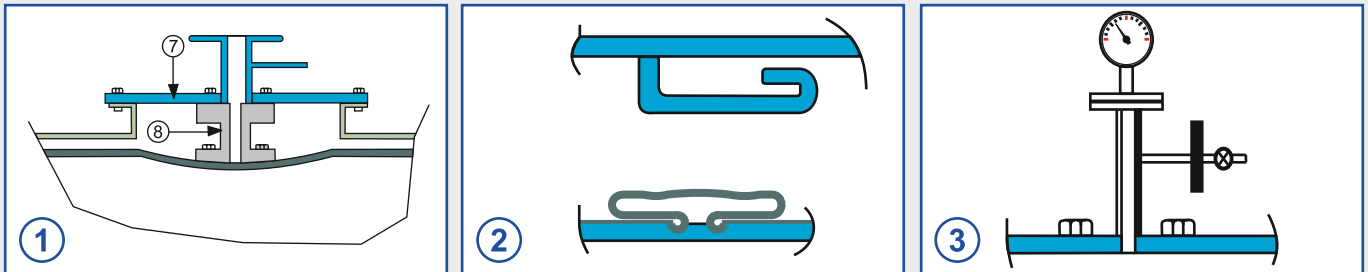
Open the valve (6) between the conservator and transformer tank and pump in more oil so that the oil rises to the conservator. The pumping speed should be suitably slow so that the pressure within the Air Cell does not exceed 13 kPa (0.13 bar). Stop pumping, when oil begins to come out of the vent valves and close the vent screws.

Step 4

Regulate the pressure in the Air Cell to normal by opening the plug in the flange or air filling valve from which the pressure hose is removed.

Step 5

Reopen the valve (6) between the conservator and the transformer tank and continue filling with oil until the oil level indicator gives the correct reading according to the temperature of transformer.



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