

## TROUBLE SHOOTING CHART FOR ALL TRANSFORMERS

Trouble	Cause	Remedy
(1)	(2)	(3)
Rise in Temperature High temperatures	Overvoltage	Change the circuit voltage or transformer connectinos to avoid - excitation
	Overcurrent	If possible, reduce load, Heating can often be reduced by improiving power factor of load, Check parallel circuits for circulating currents which may be caused by improper ratios or impedances. See Electrical Troubles, below.
	High ambient temperatures	Either improve ventilation or relocate transormer in lower ambient temperature.
	Insufficient cooling sludged oil	Fill to proper level. Use filter press to wash off core and coils. Filter oil to remove sludge.
	Short - circuited core	Test for exciting current and non-load loss. If high, inspect core and repair. See Electrical Troubles. below.
Electrical Troubles Winding failure	Lightning, Short-circuit Overload Oil of low dielectric strength	Usually, when a transformer winding fails the transormer is automatically diconnected from the power source by the opening of the supply breaker or fuse.
Core failure	Foreign material Core-insulation breakdown (Core bolt, clamps , of between laminaiton)	Smoke or cooling liquid may be expelled from the case, accompanied by noise. When there is any such evidence of a winding falure, the transformer shouldnot be re energized at full rated voltage, because this might result in additional internal damage. Also it would introduce a fire hazard in transformers. After diconnection from both source and load, the following observations and tests are recommended. (a) External mechanical or electrical in all compartments leads, potheads (b) Level of insulating liquid in all compartments (c) Temperature of insulating liquid wherever it can be measured (d) Evidence of leakage of insulating liquid or sealing compound.
High exciting current	Short-circuited core  Open core joints	Test core loss. If high, it is probably due to a short-circuited core. Test core insulation. Repair if damaged. If laminations are welded together, refer to manufacturer. Core -loss. test will show no appreciable increase. Pound joints together and retighten clamping structure.
Incorrect voltage	Improper ratio	Change terminal-board connection or ratio - adjuster Position to give correct voltage.
'Audible internal arcing and radio interference	Supply voltage abnormal Isolated metallic part	Change tep connections or readjust supply voltage. The source shuold be immediately determined. Make Certain that all normally grounded parts are grounded, such are the clamps and core.
	Losse connections Low liquid level, exposing live parts	Same as above. Tighten all connections Maintain proper liquied level.
Bushing flashover	Lightning Dirty bushings	Provide adequate lightning protection Clean bushing porcelains, frequency depending on dirt accumulation.

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<b>Mechanical Troubles</b>		
Leakage through screw Joints	Foreign material in threads	
	Oval nipples	Make tight screw joints or gasket joints
	Poor threads	
	Improper filler	
	Improper assembly	
Leakage at gasket	Poor scarfed joints	
	Insufficient or uneven Compression	
	Improper preparation of gaskets and gasket surfaces	Make tight screw joints or gasket joints
Leakage in welds	Shipping strains, imperfect weld	Repair leaks in welds.
Pressure-relief diaphragm cracked	Improper assembly, Mechanical damage	Replace diaphragm. Inspect of pipe for evidence of rust or moisture. Be sure to dry out transformer if there is a chance that drops of water may have settled directly on windings or other vulnerable locations, as oil test may not always reveal presence of free water.
Pressure-relief diaphragm ruptured	Internal fault	
<b>Mechanical Troubles</b>		
	In conservator transformer obstructed oil flow or breathing	Check to see that valve between conservator and tank is open and that ventilator on conservator is not blocked.
	In gas-seal transformer obstructed pressure relief valve	Make certain that relief valve functions and that valves in discharge line are open
	In sealed transformer -liquid Level too high	Liquid level should be adjusted to that corresponding with liquid temperature to allow ample space for expansion of liquid.
Moisture condensation in open - type transformers and airfilled compartments	Improper or insufficient Ventilators	Make sure that all ventilator openings are free.
Moisture condensation in sealed transformers	Cracked diaphragm	See remedies above for cracked and ruptured diaphragms.
	Moisture in oil	Filter oil.
Audio noise	Leaky gaskets and joints	Make certain all joints are . Tighten loose parts.
	Accessories and external Transformer parts are set into resonant vibration giving off loud noise	In some cases party may be stressed into resonant state. Releasing pressure shimming will remedy this condition.
Rusting and deterioration of paint finish	Abraded surfaces and weathering	Bare metal of mechanical parts should be covered with grease.
Fractured metal or porcelain parts of bushings	Unusual strains placed on terminal connections	Cables and bus-bars attached to transformer terminals should and bus-bars attached to transformer terminals leads, flexible connections should be provided to remove strain on the terminal and bushing porcelain.
<b>Oil Troubles (see also IS : 1866-1978*)</b>		
Low dielectric strength	condensation in open type transformers from improper Ventilation	Make certain that ventilating openings are unobstructed.
	Broken relief diaphragm	Replace diaphragm.
	Leaks around cover accessories	Regasket, if necessary
	leaky cooling coil	Test cooling coil and repair.
Badly discoloured oil	contaminated by due to switching	
	Winding or core failure	
Oxidation (sludge or acidity)	Exposure to air	'Wash down' core and coils and tank. Filter and reclaim or replace oil.
	High operating temperatures	Same as above