

Three-Phase Pad-mounted Compartmental Type

Electrical Apparatus
210-12

GENERAL

Cooper Power Systems three-phase pad-mounted compartmental type distribution transformers are designed to withstand all environmental hazards. The transformers are designed to meet or exceed all applicable ANSI, NEMA, IEEE standards, and NEC® and CEA specifications.

All transformers are newly manufactured and are produced expressly to meet exacting customer specifications. Many configurations and accessories are available to meet a wide range of application demands. Transformers from stock are available for any emergency situations that may arise.

Cooper Power Systems three-phase pad-mounted transformers are available in live-front or dead-front designs. Cooper has proven field service with pad-mounted transformers rated 45-7500 kVA, and high-voltage ratings from 2400 volts up to 46,000 volts. Designs offered include; delta and wye configurations, with single- or series-multiple combinations with either taps (for de-energized operation), or no-taps. Step-down designs are also available.

Both radial and loop feed configurations are built to ANSI standards. The dead-front bushing configurations are in accordance with ANSI C57.12.26, live-front per ANSI C57.12.22.

Cooper Power Systems transformers are built to exceed ANSI C57.12.28 for tamper resistance and for corrosion resistance. Each transformer is painted using our state-of-the-art painting system which includes eight pretreatment stages and seven coating and curing processes.

Transformer cores are manufactured from the highest quality grain oriented silicon core steel. Unlike amorphous metal cores, silicon core steel is less susceptible to ferroresonance and exhibits increasingly greater efficiency above 50% loading. Rectangular wound core construction is used offering lower losses, low excitation current, and quiet operation. Rectangular stacked core designs are available for 1500 kVA and above.



Figure 1.
Three-phase pad-mounted transformer.

The best reason to choose Cooper Power Systems three-phase transformers is that they have the lowest failure rate in the industry.

STANDARD CONNECTIONS & NEUTRAL CONFIGURATIONS

- Delta - Wye: For Delta-Wye configurations the low voltage neutral shall be a fully insulated X_0 bushing with a removable ground strap.
- Grounded Wye-Wye: For Grounded Wye-Wye configurations the high voltage neutral shall be internally tied to the low voltage neutral and brought out as the H_0X_0 bushing in the secondary compartment with a removable ground strap.
- Delta-Delta: For Delta-Delta configurations the transformer shall be provided without a neutral bushing.
- Wye-Wye: For Wye-Wye configurations the high voltage neutral shall be brought out as the H_0 bushing in the primary compartment and the low voltage neutral shall be brought out as the X_0 bushing in the secondary compartment.
- Wye-Delta: For Wye-Delta configurations the high voltage neutral shall be brought out as the H_0 bushing in the primary compartment. No ground strap shall be provided (line to line rated fusing is required).

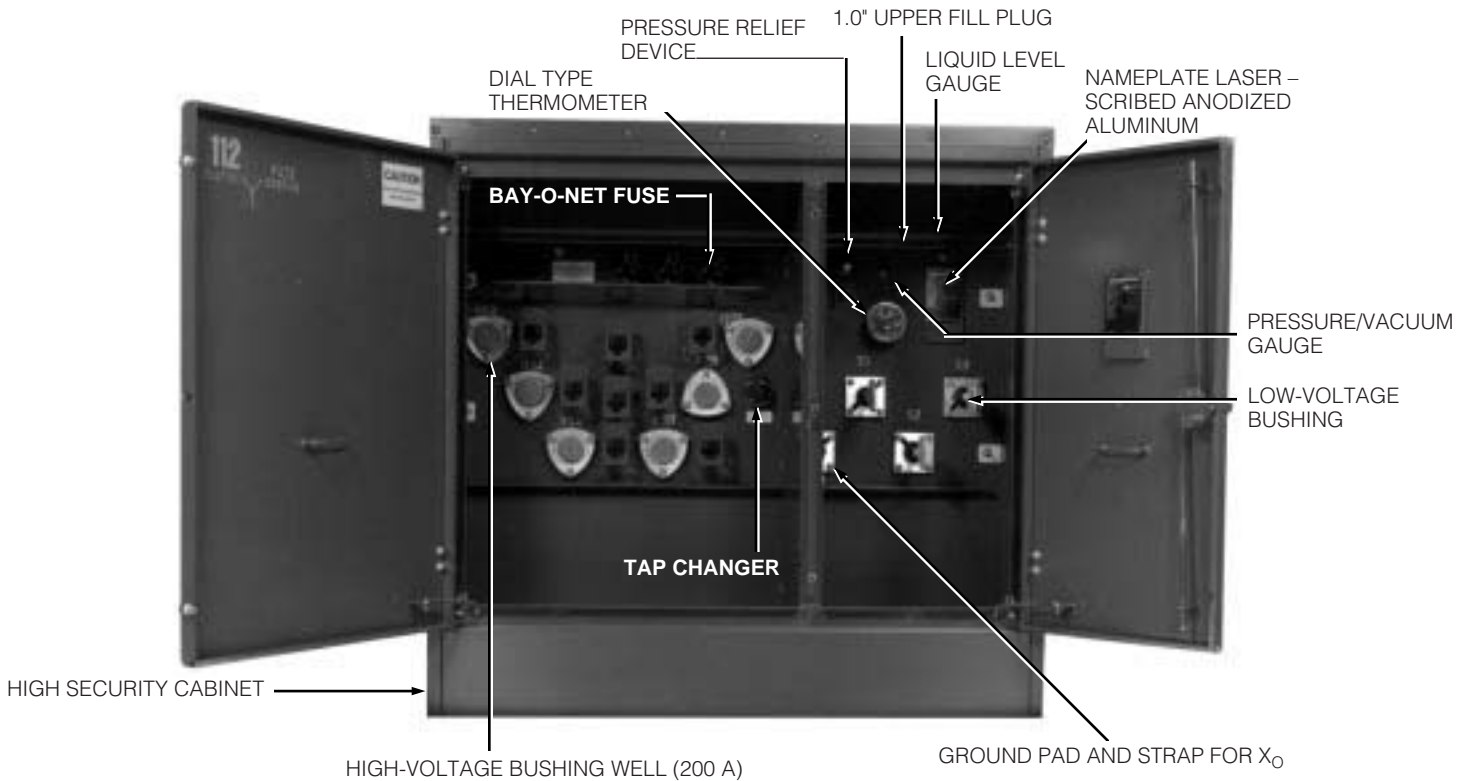


Figure 2.
Three-phase pad-mounted compartmental type transformer.

STANDARD FEATURES

- Bolted cover for tank access (45-1000 kVA)
- Welded cover with handhole (1500-7500 kVA)
- Three-point latching door for security
- Lightning arrester mounting provisions (live-front)
- Laser-scribed anodized aluminum nameplate
- One-inch drain valve with sampling device in low-voltage compartment (45-7500 kVA)
- One-inch upper fill plug
- Automatic pressure relief device
- 20" Deep cabinet (45-1000 kVA)
- 24" Deep cabinet (1500-7500 kVA)
- 30" Deep cabinet (34.5/19.92 kV)
- Removable sill for easy installation
- Steel divider between high-voltage and low-voltage compartments
- RTE® (15, 25 kV) 200 A (HTN) bushing wells
- RTE (15, 25, 35 kV) 200 A Integral bushings (dead-front)
- Cooper electrical-grade wet-process porcelain bushings (live-front)

- Lifting lugs (4)
- Stainless steel ground pads (45-500 kVA)
- Stainless steel NEMA 2-hole ground pads (750-7500 kVA)
- Stainless steel cabinet hinges & mounting studs

OPTIONAL ACCESSORIES

- Liquid level gauge
- Pressure vacuum gauge
- Dial type thermometer
- R-Temp® less-flammable fluid and other environmentally desirable fluid options
- One, two, or three On/Off loadbreak switches
- 4-position loadbreak switch – V-blade switch, T-blade switch
- Low-voltage 6-, 8-, 10-hole spade
- Low-voltage 12-, 16-, 20-hole spade (750-2500 kVA)
- Low-voltage bushing supports
- RTE (15, 25 kV) high-voltage 200 A bushing inserts
- RTE (15, 25 kV) high-voltage 200 A feedthru inserts
- RTE (15, 25 kV) high-voltage 200 A (HTN) bushing wells with removable studs

- RTE (15, 25, 35 kV) high-voltage 600 A deadbreak one-piece bushings
- Hexhead captive bolt
- High-voltage warning signs
- Ground connectors
- Drain/sampling valve in high-voltage compartment
- Breaker mounting provisions
- Touch-up paint
- Stainless steel nameplate
- Stainless steel tank base & cabinet
- Stainless steel tank base & cabinet sides and sill
- Service entrance (2 inch) in sill or cabinet side
- Nitrogen blanket with bleeder and purge valve
- Delta-wye switch
- Auxiliary contacts for liquid level gauge
- Auxiliary contacts for dial type thermometer
- All copper windings
- Globe type upper fill valve
- Kyle® Vacuum Fault Interrupter (VFI)
- K-Factor transformer
- Factory Mutual approved transformer

TABLE 1
Three-Phase Ratings

Three-Phase 50 or 60Hz 65°C, or 55/65°C Rise	
kVA Available	
45	1000
75	1500
112.5	2000
150	2500
225	3000
300	3750
500	5000
750	7500

TABLE 2
Percent Impedance Voltage

kVA Rating	Low-Voltage Rating					
	≤150 kV BIL		200 kV BIL		250 kV BIL	
	≤600 V	>600 V	≤600 V	>600 V	≤600 V	>600 V
45-75	1.00-5.00	–	7.25	–	7.75	–
112.5-300	1.20-6.0	5.5	7.25	7.0	7.75	7.5
500	1.50-7.00	5.5	7.25	7.0	7.75	7.5
750-2500	5.75	5.5	7.25	7.0	7.75	7.5
3000-5000	5.75	5.5	7.25	7.0	7.75	7.5
7500	–	6.5	7.25	7.0	7.75	7.5

TABLE 3
Low-Voltage Ratings

208Y/120
240 Delta
240 Delta with 120 Midtap
480Y/277
480 Delta
600Y/347
Other Voltages Under 600V
Other Voltages with 45 kV, 60 kV, 75 kV and 95 kV BIL are also available ¹

¹ See Table 5 for ranges of KVA's with secondaries greater than 600 volts.

TABLE 4
Range of kVA and Voltage Ratings

High-Voltage Ratings (Volts)	KVA Rating		
	Low-Voltage Ratings (Volts) 208Y/120, 240	Low-Voltage Ratings (Volts) 480Y/277, 480, 600Y/347	Low-Voltage Ratings (Volts) >600
Delta or Wye			
2400	45-750	45-750	300-750
4160	45-1000	45-1000	300-1000
4800	45-1000	45-1500	300-1500
7200	45-1000	45-2000	300-2000
12,000, 12,470	45-1000	45-3750	300-7500
13,200, 13,800, 16,340	45-1000	45-3750	300-7500
22,860, 23,900, 24,940	45-1000	45-3750	300-7500
34,500	75-1000	75-3750	300-7500
Wye			
43,800	1000	1000-3750	1000-7500

TABLE 5
High-Voltage and BIL²

Transformer		Electrical Characteristics of the Completely Assembled High-Voltage Connectors		
		High-Voltage Rating	BIL (kV)	60-Hz Dry One Minute Withstand (kV)
High-Voltage Ratings (Volts)	Minimum BIL (kV)	Phase-to-Ground /Phase-to-Phase (kV)		
Single High-Voltage				
2400	60	8.3/14.4	95	34
4160	60	8.3/14.4	95	34
4800	60	8.3/14.4	95	34
7200	75	8.3/14.4	95	34
12000	95	8.3/14.4	95	34
12470	95	8.3/14.4	95	34
13200	95	8.3/14.4	95	34
13800	95	8.3/14.4	95	34
14400	95	8.3/14.4	95	34
16430	95	8.3/14.4	95	34
22920	125	15.2/26.3	125	40
26400	150	See note ³	See note ³	See note ³
34400	200	See note ³	See note ³	See note ³
34500	200	See note ³	See note ³	See note ³
43800	250	See note ³	See note ³	See note ³
4160GrdY/2400	60	8.3/14.4	95	34
8320GrdY/4800	75	8.3/14.4	95	34
12470GrdY/7200	95	8.3/14.4	95	34
13200GrdY/7620	95	8.3/14.4	95	34
13800GrdY/7970	95	8.3/14.4	95	34
22860GrdY/13200	125	15.2/26.3	125	40
23900GrdY/13800	125	15.2/26.3	125	40
24940GrdY/14400	125	15.2/26.3	125	40
34500GrdY/19920	150	21.1/36.6	150	50
Series Multiple High-Voltage				
4160GrdY/2400 x 12470GrdY/7200	60 x 95	8.3/14.4	95	34
4160GrdY/2400 x 13200GrdY/7620	60 x 95	8.3/14.4	95	34
4800 x 13200GrdY/7620	60 x 95	8.3/14.4	95	34
8320GrdY/4800 x 24940GrdY/14400	75 x 125	15.2/26.3	125	40
12470GrdY/7200 x 24940GrdY/14400	95 x 125	15.2/26.3	125	40
13200GrdY/7620 x 24940GrdY/14400	95 x 125	15.2/26.3	125	40
23900GrdY/13800 x 34500GrdY/19920	125 x 150	21.1/36.6	150	50

² Transformers are available in the standard ratings and configurations shown or can be customized to meet specific needs.

³ Contact Cooper Power Systems for high-voltage connector information.

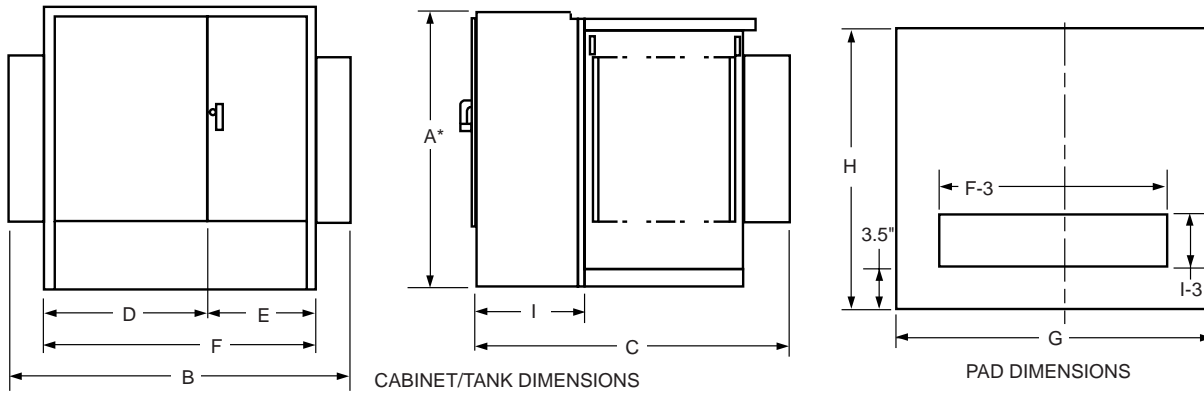


Figure 3.
Transformer and Pad dimensions.

* Add 9" for Bay-O-Net fusing.

TABLE 6
Typical Dimensions and Weights³

65°C Rise	DEAD-FRONT - LOOP OR RADIAL FEED - BAY-O-NET FUSING ¹ OIL FILLED -ALUMINUM WINDINGS										Gallons Of Fluid	Approx. Total Weight (lbs.)
	OUTLINE DIMENSIONS (in.)											
kVA Rating	A ¹	B	C	D	E	F	G	H	I			
45	50	68	39	42	26	68	72	43	20	150	2600	
75	50	68	39	42	26	68	72	43	20	160	2800	
112.5	50	68	49	42	26	68	72	53	20	165	2900	
150	50	68	49	42	26	68	72	53	20	170	3350	
225	50	72	51	42	30	72	76	55	20	180	3800	
300	50	72	51	42	30	72	76	55	20	190	4450	
500 ²	50	89	53	42	30	72	93	57	20	240	5700	
750 ²	64	89	57	42	30	72	93	61	20	380	8200	
1000 ²	64	89	59	42	30	72	93	63	20	480	10,100	
1500 ²	73	89	86	42	30	72	93	90	24	570	13,950	
2000 ²	73	72	87	42	30	72	76	91	24	640	15,000	
2500 ²	73	72	99	42	30	72	76	103	24	760	18,850	
3000 ²	73	84	99	46	37	84	88	103	24	780	19,000	
3750 ²	84	85	108	47	38	85	88	112	24	800	19,500	
5000 ²	84	96	108	48	48	96	100	112	24	930	29,400	
7500 ²	94	102	122	54	48	102	100	126	24	1580	41,900	

TABLE 7
Typical Dimensions and Weights³

65°C Rise	LIVE-FRONT - LOOP OR RADIAL FEED - BAY-O-NET FUSING ¹ OIL FILLED -ALUMINUM WINDINGS										Gallons Of Fluid	Approx. Total Weight (lbs.)
	OUTLINE DIMENSIONS (in.)											
kVA Rating	A ¹	B	C	D	E	F	G	H	I			
45	50	64	39	34	30	64	69	43	20	150	2600	
75	50	64	39	34	30	64	69	43	20	160	2800	
112.5	50	64	49	34	30	64	69	53	20	165	2900	
150	50	64	49	34	30	64	69	53	20	170	3350	
225	50	64	51	34	30	64	73	55	20	180	3800	
300	50	64	51	34	30	64	75	55	20	190	4450	
500 ²	50	81	53	34	30	64	85	57	20	240	5700	
750 ²	64	89	57	42	30	72	93	61	20	380	8200	
1000 ²	64	89	59	42	30	72	93	63	20	480	10,100	
1500 ²	73	89	86	42	30	72	93	90	24	570	13,950	
2000 ²	73	72	87	42	30	72	76	91	24	640	15,000	
2500 ²	73	72	99	42	30	72	76	103	24	760	18,850	
3000 ²	73	84	99	46	37	84	88	103	24	780	19,000	
3750 ²	84	85	108	47	38	85	88	112	24	800	19,500	
5000 ²	84	96	108	48	48	96	100	112	24	930	29,400	
7500 ²	94	102	122	54	48	102	100	126	24	1580	41,900	

¹ For fusing with Bay-O-Net only, see Cooper Power Systems catalog section 240-45 or 240-46. (Add 9" to dimension "A" for Bay-O-Net fusing.)

² Available with Kyle Vacuum Fault Interrupter for overcurrent protection. (Minimum height 72" in.)

³ Weights, gallons of fluid and dimensions are for reference only, and not for construction. Please contact Cooper Power Systems for exact dimensions.

CONSTRUCTION

Core

High efficiency rectangular wound core design offers low excitation current, low losses, and quiet performance. Cores are manufactured in either five-leg or triplex configurations from precision-cut single-turn laminations of high quality, grain oriented silicon core steel. Fully annealed after cutting and forming the lamination joints are precisely stacked, virtually eliminating gaps in the corner joints. These cores are less susceptible to ferroresonance and exhibit lower losses above 50% loading than amorphous cores. Stacked core designs are also available.

Coil

The coils are made compact, rigid, mechanically strong, and electrically balanced with impedances in accordance with ANSI C57.12.26. The wound coils are hydraulically pressed to squeeze the wire and interlayered paper tightly together, then baked to bond the windings into a solid compact coil with excellent dielectric and certified short-circuit strength when tested to ANSI C57.12.90. Extra mechanical strength is provided by diamond pattern, epoxy coated paper insulation, used throughout the coil, with additional adhesive at heavy stress points. The diamond pattern distribution of the epoxy and carefully arranged ducts provide a network of passages through which cooling fluid can freely circulate. The primary coil is manufactured from heavy varnish or paper insulated aluminum or copper wire. Round wire is flattened during winding to provide greater surface contact with the insulating paper and a higher space factor to make a compact, efficient design. The secondary coil is manufactured from full width aluminum strip whose edges are carefully finished to prevent burrs and sharp points, insulated with epoxy-diamond paper between every layer of the conductor. The dielectric insulation levels are per ANSI C57.12.00.

Insulating Fluid

Cooper Power Systems transformers are available with standard electrical grade mineral insulating oil or other dielectric coolants manufactured by Cooper Power Systems. The highly refined oil is tested and degassed to assure a chemically inert product with minimal acid ions. Special additives minimize oxygen absorption and inhibit oxidation. To ensure high dielectric strength, the oil is retested for dryness and dielectric strength,

refiltered, heated, dried, and stored under vacuum before being added to the completed transformer. R-Temp fluid, manufactured by Cooper Power Systems under strict quality control for optimum transformer cooling characteristics, provides higher dielectric strength than mineral oil. The special formulation is less-flammable as defined by the National Electric Safety Code, as well as non-toxic and biodegradable. Envirotemp® FR3 fluid, the fluid used in Envirotran® transformers is a fire resistant, natural ester-based fluid. Envirotemp FR3 fluid offers the advantage of a seed oil-based dielectric coolant with food grade additives, in addition to increased fire safety when compared to mineral oil. R-Temp and Envirotemp FR3 fluid can be used in a pad-mounted transformer next to buildings or inside buildings with suitable containment provisions.

Vacuum Processing

A very low level of moisture is a key factor in the dielectric performance and service life of a transformer. Cooper has paid extensive attention to moisture removal and it has resulted in improved reliability and the industry's longest transformer life expectancy. Cooper's vacuum process simultaneously heats and dries the transformer, removing any moisture in the components.

Circulating current, established by energizing the coils under shorted conditions, heats the coils from the inside. Any moisture turns to a gas which is pulled from the chamber by the vacuum. Once the transformer is thoroughly dried, degassed insulating fluid is added while still under vacuum to assure maximum penetration of the fluid into the coil and insulation, minimizing air pockets that can lead to internal corona failure.

Far superior to hot air dryout systems, Cooper's vacuum processing is carefully controlled to monitor actual residual moisture levels. This contrasts with simple timing according to theoretically calculated process cycle time, which is subject to variations in effectiveness due to environmental and system variances. The process maximizes dielectric strength and virtually eliminates the potential for insulation damage.

Tank

Tanks are formed of precision cut cold-rolled steel. Tank bases are constructed to permit rolling in any direction perpendicular to a tank wall. Heavy-duty lifting hooks and jack pads are provided. All tanks are pressure tested to withstand 7 psig without permanent distortion.

The interior of the tanks are painted a light gray to enhance visibility of internal components under oil. For 1000 kVA and below a bolted tank cover is standard. This permits thorough cleaning and complete painting prior to assembly, reducing the potential for contamination due to welding. Also, the tank cover is removable for field service without contaminating internal components and insulating oil. Tank covers are domed to facilitate moisture run-off. High-strength cover bolts are enclosed and concealed by a wrap-around cover guard, accessible only from inside the cabinet.

Cabinet

Patented high security features exceed ANSI requirements. The interlocked low-voltage compartment door has a three-point latching mechanism. Flush-fit doors with concealed latches and heavy-duty stainless steel hinges resist prying or probing. Doors are secured by a captive silicon bronze pentahead bolt.

A 20", 24", or 30" deep cabinet with removable sill is standard depending on kVA rating and accessory configuration. Full height 120° open doors have stops to hold them in the open position for ease of service.

Finish

An advanced multi-stage finish process exceeds ANSI standards. An eight-stage phosphate wash pretreatment assures coating adhesion and inhibits corrosion. Three-step electrodeposited and oven-hardened epoxy primer (E-coat) provides a barrier against moisture, salt, and other corrosives. Polyester powder coat (P-coat) provides resistance to abrasion and impact, and the urethane final coat adds ultraviolet protection.

THREE-PHASE VFI TRANSFORMER

The VFI transformer combines a conventional Cooper Power Systems distribution transformer with the proven Kyle Vacuum Fault Interrupter (VFI). This combination provides both voltage transformation and either transformer or loop overcurrent protection in one space saving, money saving package.

The three-phase VFI transformer with transformer protection protects the transformer and provides proper coordination with upstream protective devices. When a transformer fault or overload condition occurs, the VFI breaker trips and isolates the transformer, leaving the feeder uninterrupted.

The three-phase VFI transformer with loop protection protects the loop or downstream section of a feeder. When a fault occurs downstream, the VFI breaker trips and isolates the fault, leaving the transformer load uninterrupted.

The three-phase VFI breaker has independent single-phase initiation, but is three-phase mechanically gang-tripped. A trip signal on any phase will open all three phases. This feature eliminates single-phasing of three-phase loads. It also enables the VFI breaker to be used as a three-phase loadbreak switch. Because the VFI breaker is resettable, restoring three-phase service is faster and easier.

R-TRAN™ FM APPROVED TRANSFORMER

Cooper Power Systems' R-Tran Transformer is FM Approved for indoor locations. Factory Mutual Research Corporation's approval of the R-Tran transformer line makes it easy to comply and verify compliance with the 1996 National Electrical Code (NEC) section 450-23, Less-Flammable Liquid-Filled Transformer Requirements for both indoor and outdoor locations.

FM Approved R-Tran transformers offer the user the benefit of a transformer that can be easily specified to comply with NEC, and makes FM Safety Data Sheet compliance simpler, while also providing maximum safety and flexibility for both indoor and outdoor installations. Because the "FM Approved" logo is readily visible on the transformer and its nameplate, NEC compliance is now easily verifiable by the inspector.

Three-Phase Pad-mounted R-Tran FM Approved transformers from Cooper Power Systems are manufactured under strict compliance with FMRC Standard 3990, and are filled with FM Approved R-Temp fire-resistant dielectric coolant.

TESTING

Cooper performs routine testing on each transformer manufactured, utilizing our unique Automated Test Program. This integrated, computer controlled, series of tests provides all routine test data in real time, enabling virtually instant generation of certified test reports. The tests include:

- **Insulation Power Factor:** This test verifies that vacuum processing has thoroughly dried the insulation system to required limits.
- **Ratio, Polarity, and Phase Relation:** Assures correct winding ratios and tap voltages; checks insulation of HV and LV circuits.
- **Resistance:** Verifies the integrity of internal HV and LV connections; provides data for loss upgrade calculations.
- **Routine Impulse Tests:** The most severe test, simulating a lightning surge. Applies one reduced wave and one full wave to verify the BIL rating.
- **Applied Potential:** Applied to both high-voltage and low-voltage windings, this test stresses the entire insulation system to verify all live-to-ground clearances.
- **Induced Potential:** 3.46 times normal plus 1000 volts for reduced neutral designs.

- **Loss Test:** These design verification tests are conducted to assure that guaranteed loss values are met and that test values are within design tolerances. Tests include no-load loss and excitation current along with impedance voltage and load loss.

- **Leak Test:** Pressurizing the tank to 7 psig assures a complete seal, with no weld or gasket leaks, to eliminate the possibility of moisture infiltration or oil oxidation

Design performance tests include:

- **Temperature Rise:** Our automated heat run facility ensures that any design changes meet ANSI temperature rise criteria.
- **Audible Sound Level:** Ensures compliance with NEMA requirements.
- **Lightning Impulse:** To assure superior dielectric performance, this test consists of one reduced wave, two chopped waves and one full wave in sequence, precisely simulating the harshest conditions.

We are constantly striving to introduce new innovations to the transformer industry, bringing you the highest quality transformer for the lowest cost. Cooper Power Systems Transformer Products is working towards ISO9001 compliance, emphasizing process improvement in all phases of design, manufacture, and testing. We are so dedicated to introducing new innovations and technologies to the transformer industry we have invested millions of dollars in the Thomas A. Edison Technical Center, our premier research facility in Franksville, Wisconsin. Headquarters for the Systems Engineering Group of Cooper Power Systems, this research facility is fully available for use by our customers to utilize our advanced electrical and chemical testing labs.

**COOPER** Power Systems

SAFETY DATA SHEET

SUNOCO TYPE II TRANSFORMER OIL



Section 1 - Identification

1.1 Product Identifiers

Product Name : SUNOCO TYPE II TRANSFORMER OIL
Product Code(s) : 1013-000, 1013-055, 1013-005, 1013-016, 1013-330

1.4 Supplier Information

SUNOCO LUBRICANTS
PO BOX 16270
Philadelphia, PA 19154
United States

Phone : 800-660-0761
Fax : 215-352-0140

1.2 Product Usage

Recommended Usage : Transformer Oil
Restricted Usage : Not Intended for any other usage

1.3 Emergency Support

Emergency Support : CHEMTREC
United States/Canada +1(800) 424-9300

Section 2 - Hazards Identification

2.1 Classification of the Substance or the Mixture

GHS Rating(s) : Aspiration Category 1
Signal Word : Warning

2.2 Label Elements



H304: May be fatal if swallowed and enters airways

Precautionary : **P201** Obtain Special Instructions Before Use.
: **P202** Do Not Handle Until All Safety Precautions Are Understood.
: **P281** Use Personal Protective Equipment As Required.

Response : **P308** If Exposed Or Concerned: Get Medical Advice/attention.

Storage : **P405** Store Locked Up.

Disposal : **P501** Dispose Of Container According To Regional Regulations.

2.3 Other Hazards

Section 3 - Composition / Information on Ingredients

3.1 Substance Details

Chemical Name	CAS #	%Weight
DISTILLATES (PETROLEUM), HYDROTREATED LIGHT NAPHTHENTIC	64742-53-6	90.0
DISTILLATES (PETROLEUM), HYDROTREATED LIGHT PARAFFINIC	64742-55-8	5.0
DISTILLATES (PETROLEUM), SOLVENT-DEWAXED LIGHT PARAFFINIC	64742-56-9	5.0

Products containing mineral oil with less than 3% DMSO extract as measured by IP-346.

Section 4 - First Aid Measures

4.1 First Aid Measures

- Eye Contact** : Immediately flush eyes with plenty of water occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for atleast 20 minutes. Get Medical Attention.
- Inhalation** : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth to mouth resuscitation. Maintain an open airway. Get medical attention if symptoms occur.
- Ingestion** : Wash out mouth with water. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Never give anything by mouth to an unconscious person. get medical attention if symptoms occur.

4.2 Symptoms & Effects

- To Physician** : Treat symptomatically. Contact poison specialist if product has been ingested.
- Specific Treatment** : No Specific Treatment.

4.3 Medical Attention

- Protection of First Aiders** : No action should be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.
- Note To Doctor** : Aspiration during swallowing or vomiting may severely damage the lungs. If evacuation of stomach contents is necessary, use method least likely to cause aspiration.

Section 5 - Fire Fighting

5.1 Extinguishing Media

Suitable Media : CO2, Dry chemical, or Foam. Water can be used to cool and protect product. Do not use
Unsuitable Media water jet as an extinguisher, it will spread the fire.

Specific hazards arising from this product : When heated, hazardous gases may be released including: sulfur dioxide. A solid stream of water will spread the burning material. Material creates a special hazard because it floats on water. This material creates a special hazard because it floats on water. This material is harmful to aquatic life. Any fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.

5.3 Firefighters Advice

Special protective equipment : Fire Equipment Information: Fire-fighters should wear appropriate protective equipment and self contained breathing apparatus(SCBA) with a full face -piece operated in positive pressure mode.

Section 6 - Accidental Release Measures

6.1 Personal precautions, protective equipment

General Measures : No health effects expected from the cleanup of this material if contact can be avoided. Follow personal protective equipment recommendations found in section 8 of this SDS.

6.2 Environmental Precautions

Non-Emergency Personnel : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform authorities if the product has caused environmental pollution. Water Polluting Material may be harmful to the environment if released in large quantities.

6.3 Materials & Methods to Contain and Cleanup

Reference Section 8 : Follow all protective equipment recommendations provided in Section 8.

Spill Control Measures : Prevent the spread of any spill to minimize harm to human health and the environment if safe to do so. Wear complete and proper personal protective equipment following the recommendation of Section 8 at a minimum. Dike with suitable absorbent material like granulated clay. Dispose of according to Federal, State, Local, or Provincial regulations. Used fluid should be disposed of at a recycling center.

Containment and Cleanup : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillage's with noncombustible, absorbent material e.g. sand earth vermiculite or diatomaceous earth and place in container for disposal according to local regulations. Dispose of via licensed waste disposal contractor. Contaminated absorbent material may pose the same threat hazard as the spilled product.

Section 7 - Handling & Storage

7.1 Safe Handling

Personal Protective Equipment : Put on appropriate personal protective equipment (see section 8). Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapor or mist. Avoid release to the environment. Keep in the original container or an approved alternative made from a compatible material, keep lid tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

7.2 Safe Storage

Required conditions : Odorous and toxic fumes may form from the decomposition of this product if stored at temperatures in excess of 113 deg F (45 deg C) for extended periods of time or if heat sources in excess of 250 deg F (121 deg C) are used. Store away from incompatible materials. See section 10 for incompatible materials.

7.3 Specific End Use

Designed Purpose : This product is designed for use as a Transformer Oil

Section 8 - Exposure Control

8.1 United States Exposure Limits

CAS	Chemical Name	Exposure Limits	Source
64742-55-8	Distillates, petroleum, hydrotreated light paraffinic	5mg/m3	NLM_CI
64742-56-9	Distillates, petroleum, solvent-dewaxed light paraffinic	5mg/m3	IUCLID
64742-53-6	Distillates, petroleum, hydrotreated light naphthenic	5mg/m3	IUCLID

8.2 Exposure Controls

Engineering Controls : Material should be handled in enclosed vessels and equipment, in which case general room ventilation should be sufficient. Local exhaust ventilation should be used at points where dust, mist, vapors or gases can escape into the room air. No special requirements under ordinary conditions of use and with adequate ventilation.

Environmental Exposure Controls : General room ventilation should be satisfactory. Local exhaust ventilation may be necessary if misting is generated.

Hygiene Measures : Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing to remove contaminants. Discard contaminated footwear that cannot be cleaned.

Eye / Face Protection : If contact is likely, safety glasses with side shields are recommended.

Skin / Hand Protection : Butyl rubber. Use nitrile or neoprene gloves. Use good industrial hygiene practices. In case of skin contact, wash hands and arms with soap and water. Use caution when opening manway covers of storage and transportation containers. 3-nitroaniline crystals may be present on the interior surface of these openings. 3-nitroaniline is toxic by dermal exposure.

Respiratory Protection : Use a properly fitted air purifying or supplied air respirator complying with an approved standard if a risk assessment indicates this a necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9 - Physical & Chemical Properties

9.1 Information On Basic Physical and Chemical Properties

Physical state	: Liquid
Color	: Amber
Odor	: Characteristic of Petroleum
Odor threshold	: No Data Available
pH	: No Data Available
Freezing Point	: No Data Available
Boiling Point / Range	: No Data Available
Flash Point COC	: 176C
Evaporation rate:	: No Data Available
Upper Explosive Limits (% air)	: No Data Available
Lower Explosive Limits (% air)	: No Data Available
Flammability (solid, gas)	: Not Applicable
Vapor pressure	: <1 mm Hg
Vapor density (air=1)	: > 1
Relative Density	: 0.89
Auto-ignition temperature	: Not Determined
Decomposition temperature	: Not Determined
Solubility in water	: Negligible, 0-1%
Partition coefficient, n-octanol/water	: No Data Available

Section 10 - Stability & Reactivity

10.1 Material Analysis

Reactivity	: No Data Available
Chemical stability	: Stable Under Normal Circumstances.
Possibility of hazardous reactions	: Hazardous polymerization will not occur.

10.2 Environmental

Conditions to avoid	: Temperatures above the high flash point of this combustible material in combination with sparks, open flames, or other sources of ignition.
Incompatible materials	: Strong oxidizing agents
Hazardous decomposition products	: Carbon monoxide, Smoke, Carbon monoxide, sulfur oxides, aldehydes, and other petroleum decomposition products in the case of incomplete combustion. Oxides of nitrogen, phosphorus, calcium, copper, magnesium, sodium, and hydrogen sulfide may also be present

Section 11 - Toxicological Information

11.1 Toxicological Effects

Ingestion Toxicity	: No hazard with normal usage. Aspiration Hazard, may enter lungs if ingested.
Skin Contact	: This material is likely to be slightly irritating to skin based on animal data.
Inhalation Toxicity	: No data available. Vapors may form which are irritating to respiratory system.
Eye Contact	: The material is likely to be irritating to eyes based on animal data.

11.2 Inhalation Toxicity Data

CAS	Chemical Name	Test	Value	Species	Source
64742-55-8	Distillates, petroleum, hydrotreated light paraffinic	Inhalation	3900.0mg/m3 4h	Rat	NLM_CIP

Section 11 - Toxicological Information Continued

Sensitizer	: No data available to indicate product or components may be a skin sensitizer.
Mutagenicity	: No data available to indicate product or any components present at greater than 0.1% is mutagenic or genotoxic.
Carcinogenicity	: Not expected to cause cancer. This product meets the IP-346 criteria.
Reproductive Toxicity	: No data available if components greater than 0.1% may cause birth defects.

Section 12 - Ecological Information

12.1 Aquatic Toxicity

Persistence and degradability	: No Data Available.
Bioaccumulative potential	: Bioconcentration may occur. No Data Available.
Mobility in soil	: No Data Available.
Results of PBT and vPvB assessment	: Not Determined.
Other adverse effects	: No Data Available.

12.2 LC50 Toxicity Data

CAS	Chemical Name	Test	Value	Species	Source
64742-55-8	Distillates, petroleum, hydrotreated light paraffinic	LC50	5000.0mg/L 96h	Oncorhynchus	IUCLID
64742-56-9	Distillates, petroleum, solvent-dewaxed light paraffinic	LC50	5000.0mg/L 96h	Oncorhynchus	IUCLID
64742-53-6	Distillates, petroleum, hydrotreated light naphthenic	LC50	5000.0mg/L 96h	Oncorhynchus	IUCLID

12.3 Other Toxicity Data

CAS	Chemical Name	Test	Value	Species	Source
64742-55-8	Distillates, petroleum, hydrotreated light paraffinic	EC50	1000.0mg/L 48h	Daphnia magna	IUCLID
64742-56-9	Distillates, petroleum, solvent-dewaxed light paraffinic	EC50	1000.0mg/L 48h	Daphnia magna	IUCLID
64742-53-6	Distillates, petroleum, hydrotreated light naphthenic	EC50	1000.0mg/L 48h	Daphnia magna	IUCLID

Section 13 - Disposal Considerations

13.1 Waste treatment

Waste treatment methods	: Dispose of according to Federal, State, Local, or Provincial regulations.
Disposal Methods	: Recycle used oil.
Waste Disposal	: Use material is non-hazardous according to environmental regulations.
Contaminated packaging	: Recycle containers whenever possible!

Section 14 - Transportation Information

14.1 U.S. Department of Transportation (DOT)

14.2. Shipping Description	: If shipped by land in a packaging having a capacity of 3,500 gallons or more, the provisions of 49 CFR, Part 130 apply. (Contains oil) International Maritime Dangerous Goods (IMDG)
14.2. DOT Compliance Note	: U.S. DOT compliance requirements may apply. See 49 CFR 171.22, 23 & 25. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not applicable International Civil Aviation Org. / International Air Transport Assoc. (ICAO/IATA)
14.2. DOT Compliance Requirement	: U.S. DOT compliance requirements may apply. See 49 CFR 171.22, 23, 24

Section 15 - Regulatory Information

Agency Inventory Status

(TSCA) Toxic Substance Control Act : All components are either listed or not regulated US TSCA Inventory.

64742-53-6
64742-55-8
64742-56-9

WHMIS Hazard Class : None

Canada CPR : This product has been classified in accordance with the hazard criteria Controlled Products Regulations (CPR) and the SDS contains all the information required by the Regulations.

CERCLA Sections

302, 313, 372 : This material does not contain reportable chemicals.
311, 312 : Acute Health Hazard No Pressure Hazard No Fire Hazard No
 Chronic Health Hazard No Reactive Hazard No

New Jersey Right to Know (NJ RTK)

This material does not contain reportable chemicals.

Massachusetts Right to Know (MA RTK)

This material contains the following listed chemicals 64742-53-6
64742-55-8
64742-56-9

Pennsylvania Right to Know (PA RTK)

This material does not contain reportable chemicals.

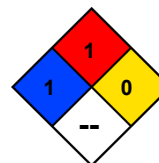
Rhode Island Right to Know (RI RTK)

This material does not contain reportable chemicals.

Section 16 - Other Information

ACGIH American Conference of Governmental Industrial Hygienists
CFR Code of Federal Regulations
DOT United States Department of Transportation
GHS Globally Harmonized System of Classification and Labeling of Chemicals
NIOSH National Institute for Occupational Safety and Health
OSHA Occupational Safety and Health Administration
PEL Permissible Exposure Limit
RTK Right-to-Know
SARA Short-term Exposure Limit
TSCA Toxic Substances Control Act
WHMIS Workplace Hazardous Materials Information System

NFPA: HEALTH 1
FLAMMABILITY 1
INSTABILITY 0
SPECIAL -



Disclaimer: This safety data sheet and the information it contains is offered to you in good faith as accurate. We have reviewed any information contained in the data sheet which we have received from outside sources and we believe the information to be correct, but cannot guarantee its accuracy or completeness.

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