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## MT-PML-R7-3P-GMF-3.37MVA-GMR-LT-DD-A6-BB-CZ-2B4-M1

# 3.75/5.2 MVA Pad Mount Transformer - 24940Y/14400 Grounded Wye Primary, 12470Y/7200 Grounded Wye Secondary - KNAN/KNAF/Bell Green - 55C/65C, Fan Cooled

**Product ID: 301546**

**Please see last page for supporting documentation for this product(certificates, CAD files & drawings, IES files, wiring diagrams, etc).**



**Larson Electronics LLC manufactures a wide variety of products, including custom built to spec designs. The pictures displayed for this unit are a general representation of form factor for the product line and may not accurately represent this exact configuration in every detail due to custom builds and changes between similar products in our standard catalog. The specifics for this configuration are listed in the specification table and supporting documentation (CAD files, Dimensional Drawing, Name Plate Diagram, Wiring Diagram, etc.). This means that specific details (receptacles, plugs, wires, connections, mounting brackets, external finishes, etc.) may not be accurately represented in images vs specifications. Please review specifications and do not order based solely on images.**

**MT-PML-R7-3P-GMF-3.37MVA-GMR-LT-DD-A6-BB-CZ-2B4-M1 Pad Mount Transformer**
**Transformer Type:** Pad Mounted, Compartmental-Type
**Transformer Configuration:** Liquid Filled Pad Mounted
**Transformer Feed Type:** Loop Feed
**Operation:** Step-Down Operation (Not Approved for Step-Up)
**Phase:** Three Phase
**Capacity @ 55° (w/o Fans)** 3.75 MVA (3750 KVA)
**Capacity @ 55° (w/ Fans):** 4.6 MVA (4650 KVA)
**Capacity @ 65° (w/o Fans):** 4.2 MVA (4200 KVA)
**Capacity @ 65° (w/ Fans):** 5.2 MVA (5208 KVA)
**Vector Group: YnYn0**
**Primary Voltage:** 24940GrdY/14400
**Primary Voltage Switch:** N/A
**Primary Voltage Class:** 35 kV Class
**Primary Phasor:** Grounded Wye
**Primary BIL:** 150 KV
**Secondary Voltage:** 12470GrdY/7200
**Secondary Voltage Class:** 5 kV Class
**Secondary Phasor:** Grounded Wye

**Secondary BIL:** 95 kV

**Frequency:** 60 Hz
**Temperature Rise:** 55°/65°C
**Insulation Rating:** Class E Insulation - 120°C, 248°F
**Cooling Class:** KNAN/KNAF

**Ratings**

Meets/Exceeds DOE 2016 Efficiency Ratings
Complies with ANSI / IEEE C57.12.00
Complies with ANSI / IEEE C57 12.28
Complies with ANSI / IEEE C57 12.29
Complies with ANSI / IEEE C57 12.34
Complies with ANSI / IEEE C57 12.35
Complies with ANSI / IEEE C57.12.70
Complies with ANSI / IEEE C62.11
Complies with ASTM D3487
Pentahead Bolt Entry Assembly
High-Fire Point Insulating Fluid
Non-PCB Insulating Fluid
Tamper Proof Housing
Hinged Front Compartment Doors, Pad Lockable
NEMA 3R Wiring Compartment
Hot Stick Included, HV Door Mount

**Efficiency %:** 98.00%
*Based on transformer operating at 50% of nameplate base kVA.*

**Load Losses Based on 85°C Reference Temp.**
**No Load Loss (in watts)):** +/- 5,985W
**Full Load Loss (in watts) at 100%:** +/- 24,402W

**Forced Air (Fans):** Included, 115/230V 60 Hz Capable
**Tap Changer:** 5-position Tap Changer
**Tap Qty:** (2) FCAN Above Taps, (2) FCBN Below Taps
**Tap %:** 2.5%
**Tap Changer Switch Rating:** 300-Amp, 35 kV
**Tap Changer Switch Location:** High Voltage (HV) [Left Side] Front Compartment
**Impedance (Typical):** 5.0-7.5% Typical
**Primary Connection Type:** Dead Front
**Primary Termination Arrangement:** V Terminal Arrangement
**Primary Termination:** Externally Clamped Integral Bushings w/ Removable Studs, 600A Dead Break Elbows
**Primary Connection Qty:** (6) Primary Connections for use w/ Elbow Connectors
**Primary Parking Stand Qty:** (6) Welded Brackets for Installing Accessory Pakring Stand Bushings
**Primary Bushing Rating:** 35 kV Class, 150 kV BIL, 600A, Dead Break
**Primary Neutral Connection:** Primary HO Neutral Internally Bonded to Tank
**Primary Surge Arrestors:** (3) High Voltage Elbow Surge Arrestors, Included
**Primary Surge Arrestor Voltage Rating:** 18 kV Class Elbow Arrestor
**Primary Surge Arrestor MCOV Rating:** 15.3 kVrms
**Primary Over Current Protection (OCP):** Bayonet Expulsion Fuse in series w/ Partial-Range Current-Limiting Fuse
**Primary Over Current Protection Method:** Fused, Oil-Immersed
**Primary Over Current Protection Holder:** Bayonet Fuse Holder w/ External Drip Shield
**Primary Grounding Provisions:** (1) NEMA Ground Bar attached to tank via (2) Welded Ground Bungs in HV Cabinet
**Secondary Connection Type: Dead Front**
**Secondary Termination Arrangement:** Inline Terminal Arrangement
**Secondary Connections:** Externally Clamped Integral Bushings w/ Removable Studs, 600A Dead Break Elbows
**Secondary Connection Qty:** (3) Secondary Connections for use w/ Elbow Connectors
**Secondary Connection Supports:** N/A
**Secondary Over Current Protection (OCP):** N/A
**Secondary Neutral Connection:** Secondary XO Neutral Internally Bonded to Tank
**Secondary Grounding Provisions:** (1) NEMA Ground Bar attached to tank via (2) Welded Ground Bungs in LV Cabinet
**Metering Current Transformer (CT):** N/A

**Metering Panel:** N/A

**Auxiliary Control Panel :** Included Fan Control Panel w/ 2400-120/240V XFMR
**Load Break Switch:** 4-Position Load Break Switch
**Load Break Switch Qty:** (1)
**Load Break Switch Rating:** 300-Amp, 35 kV
**Load Break Switch Location:** High Voltage (HV) Front Compartment
**Efficiency Standard(s):** Meets DOE 2016 Standards, Meets ANSI/IEEE Standards
**K-Factor Rating (Harmonic Mitigation):** K-1 (Standard)
**Pulse Drive Rating:** N/A
**Insulation Fluid:** Biodegradable Natural Vegetable Oil Ester Insulating Fluid - Non-PCB Fluid
**Fluid (Oil) Capacity*:** 330 Gallons
**Fluid (Oil) Weight*:** 2,545 Lbs
**Liquid Level Indicator:** Analog Dial Gauge
**Temperature Indicator:** Analog Dial Gauge
**Pressure/Vacuum Indicator:** Analog Dial Gauge
**Pressure Relief Device:** Included, Automatic Action
**Gas Sampler Valve:** Included, Schrader Valve
**Fill Valve:** 1" NPT Port w/ Removable Bolt Plug
**Fill Valve Location:** Front Compartment
**Drain Valve:** 1" NPT Port w/ 5/8" NPT Sampler Valve
**Drain Valve Location:** Front Compartment
**Winding Material: Copper**
**Ambient Temperature Rating:** 40°C
**Sound Level:** 63 dBA
**Elevation (Altitude):** 3300ft (1000 meters) Above Sea Level
**Core Material:** Grain Oriented Steel
**Tank Material:** Coated Steel
**Cabinet Material:** Coated Steel
**Base Platform Material:** Coated Steel
**Portability:** Lifting lugs, provisions for jacking under base, w/ base construction suitable for using rollers or skidding
**Housing Type:** Compartmental Air-Filled Cabinet w/ Locking Doors, HV Compartment Left, LV Compartment Right, Steel Barrier Separation, HV Door Spring-Loaded Release Pin in LV Compartment

**Total Load Loss (in watts) at 100%:** +/- 30,387W

**Total Losses at 55°C LL Temp.& 20°C NL Temp.**
**Total Load Loss (in watts) at 50%:** +/- 12,090W
***Note:*** *Losses offered are typical only, not guaranteed*

**Labeling:**
Externally Stencilled (Painted) KVA Rating
Externally Stencilled (Painted) Voltage Rating

External Non-PCB Label

External Warning & Danger Label

External Barcode Label

Internal Busing & Accessory Labeling
Stainless Steel Riveted Nameplate

**Factory Tests:**
Winding Resistance Test

Insulation Resistance Test

Voltage Ratio Error Test
Short-circuit Impedance Test

No-load Loss (Wattage) Test

Load Loss (Wattage) Test
Induced Voltage Withstand Test

Separate Source Voltage Withstand Test

Pressure Integrity Test Test

**Shipping:**
Shipped on pallet on open flatbed

Palletized on Wooden Pallet w/ Skid Pockets

Pallet Skid Facing Outward Sides of Truck
***Note:*** *Crated shipping in lieu of palletizing can be done upon request for an additional fee*

**Enclosure Rating:** NEMA 3R Weatherproof Wiring Cabinet, Sealed Tank
**Seismic Rating:** Yes
**Paint Type:** Weatherproof and UV Resistant Epoxy Coating and Undercoating
**Finish Color:** Munsell™ 7.0 GY 3.29/1.5 Bell Green
**Mounting:** Pad Mounted
**Conduit Opening:** Bottom Feed Underground Entry/Exit
**HV Compartment Base Wireway Dimensions*:** 21"-7 x 7"-D
**LV Compartment Base Wireway Dimensions*:** 26"-W x 7"-D
**MV/LV Compartment Cabinet Depth*:** 24"-D
**Tank Cover Access Handhole:** N/A
**Dimensions*:** 90"-W x 80"-D x 83"-H
**Dry Weight (w/o Oil)*:** 5,810 Lbs
**Total Weight (Liquid Filled)*:** 12,576 Lbs
*Please note that numbers are approximate and subject to change

**Special Orders - Special Requirements**
Contact us for special requirements

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**The MT-PML-R7-3P-GMF-3.37MVA-GMR-LT-DD-A6-BB-CZ-2B4-M1 from Larson Electronics is an Industrial Pad Mount Transformer that offers powerful, reliable, and efficient power distribution in indoor, outdoor, and public locations. The low operating costs, low heat emissions, and low cost of ownership makes this transformer ideal for a wide range of applications and businesses. An enclosed design caters to installations on concrete pads without protective fencing.**

***PLEASE NOTE: ANY FREE SHIPPING OFFERS DO NOT APPLY TO POWER DISTRIBUTION PANELS, TRANSFORMERS, OR SUBSTATIONS****

**Transformer Features:** With a transformer rating of 3750 KVA (3.75 MVA) to 5208 KVA (5.2 MVA), the industrial transformer features a dual rated primary voltage of three-phase 24940Y/14400 grounded Wye and a secondary voltage of three-phase 12470Y/7200 Grounded Wye. An input voltage switch allows the transformer to be switched between primary voltages. The unit has a primary loop feed for single installations and dead-front primary connections. This transformer features a 5-position tap changer with two, +/- 2.5% taps above and two, +/- 2.5% taps below to allow small changes for voltage. There are no load break switches, rapid rise relays and protection fuses present on the system.
copper transformer winding material helps improve performance, reduce weight and lower cost. Compared to copper, copper windings have lower eddy losses due to higher resistivity. This transformer consists of rectangular coil and five-legged wound core design with three coils and four core loops (this is for three-phase transformers only; single-phase units have one coil and two core loops).
The MT-PML-R7-3P-GMF-3.37MVA-GMR-LT-DD-A6-BB-CZ-2B4-M1 is air cooled and does not have fans or mounting provision for fans.

**Enclosure Design:** This pad mounted transformer is a compartmental design. The tank and housing are fabricated from steel. The front electrical enclosure carries a NEMA 3R rating. The high voltage and low voltage compartments are located in front of the transformer tank, with the high voltage compartment on the left side and low voltage compartment on the right side. The HV and LV compartments are air filled and separated by a full length steel barrier between the compartments. A removable steel plate at the base of the HV and LV compartments prevents rodents and other intrusions from entering the enclosure once installed. This steel plate allows for underground conduit entry into the enclosure compartments. Two hinged exterior doors allows for access into the compartments. A single pad lockable handle on the low voltage compartment door allows for securing the transformer. A spring loaded pin within the low voltage compartment prevents the high voltage door from being opened without pulling the safety pin. A hot stick is included in the high voltage compartment, mounted to the HV door.

**Temperature Rise:** This unit features 55°C/65°C temperature rise for reduced heat waste, increased reliability and longer life. At 55°C temperature rise, the transformer offers 3750 KVA (3.75 MVA) without fans operating, and 4650 KVA (4.6 MVA) with fans turned on. At 65°C temperature rise, the transformer offers 4200 KVA (4.2 MVA) without fans operating, and 5208 KVA (5.2 MVA) with fans

turned on. The transformer meets standard efficiency requirements. The combination of low temperature rise and high efficiency makes this unit suitable for use in electrical rooms, air conditioned spaces in buildings, underground vaults and similar locations, in addition to outdoor areas.
**Insulation Fluid:** The MT-PML-R7-3P-GMF-3.37MVA-GMR-LT-DD-A6-BB-CZ-2B4-M1 features biodegradable cooling fluid (KNAN/KNAF) with a capacity of 350 gallons. We offer transformers with FR-3 oil fluid, if needed.
**Biodegradable Fluid:** Biodegradable cooling fluid (vegetable oil) has a higher heat capacity compared to mineral oil, making the liquid safer to use and more reliable during operations. Vegetable oil has a higher flash point and fire point than mineral oil, hydrocarbon oil, silicone oil and synthetic ester. This cooling fluid is also non-toxic and can tolerate higher breakdown voltages than mineral oil. When operating at high temperatures, biodegradable cooling liquid sustains up to 120% loan conditions, which helps preserve the transformer's lifespan and performance.
**Gauges:** The following gauges are included with the system: liquid level, temperature and pressure/vacuum gauges. Standard liquid level, temperature and pressure/vacuum gauges are analog, manual reading types. These gauges do not have auxiliary contacts.
**Fault Pressure Devices:** This transformer features an automatic action fault pressure device. Fault pressure devices are used to detect high rates of pressure rise within the tank.
**Rapid Rise Relay:** There are no rapid rise relays on the unit. This safety component is designed for protection when a rapid increase in tank pressure occurs. The relay is suitable for detecting sudden pressure fluctuations above predetermined safe limits.
**Surge arresters:** This system comes with high elbow surge arresters on the primary side. Designed for over-voltage and transient voltage protection, the components prevent damage caused by lightning, internal switching or voltage surges. We can offer models without high elbow surge arresters that have mounting provisions for customer-provided surge arresters.
**Valves:** The MT-PML-R7-3P-GMF-3.37MVA-GMR-LT-DD-A6-BB-CZ-2B4-M1 is equipped with a pressure relief valve, fill valve, and drain valve with sampler port.
**Protection Fuses:** This transformer does not contain protection fuses. For units without protection fuses, up stream protection is provided. We recommend provisions for protection fuses when possible, as blown fuses may require more frequent oil changes.
**Mount:** The heavy-duty enclosure makes the unit suitable for both indoor and outdoor applications. This power distribution system can be pad mounted on concrete pads.
**Benefits:** The MT-PML-R7-3P-GMF-3.37MVA-GMR-LT-DD-A6-BB-CZ-2B4-M1 pad mount transformer offers many benefits to consumers. This transformer provides owners with significant energy savings, as well as offering environmental benefits. Higher efficiency not only extends the life of the transformer, but also turns into cost savings for owners in the form of lower energy bills and decreased cost of ownership.
**Applications:** General purposes, industrial sites, electrical rooms, underground vaults, manufacturing facilities, steel plants, offshore, commercial, military, processing plants, electric power distribution, utilities, public locations, and more. Larson Electronics is a manufacturer and as such can build stationary and portable transformer systems to your specifications. Although we carry several models of power distribution transformer systems, we can deliver custom ordered units almost as quickly as our prebuilt units. If this model does not meet your needs, please contact us at 1-800-369-6671 or sales@larsonelectronics.com to discuss your specific requirements.

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# Frequently Asked Questions (FAQ)

**Q. What type of transformers does Larson Electronics offer?**

A. Larson Electronics offered dry type transformers and liquid filled transformers. For liquid filled transformers, Larson Electronics' offers overhead distribution transformers (utility pole mount), pad mounted distribution transformers (mounts to a concrete pad), pad mounted power transformers, underground submersible distribution transformers, and substation transformers.

**Q. What are the main benefits of a liquid filled transformer?**

A. Liquid filled transformers have higher energy efficiency, durability, short circuit strength, low sound level, lower maintenance costs, and longer useful life expectancy compared to dry type transformers.

**Q. What materials do you offer?**

A. We offer coated steel and stainless steel tank and housing materials. Stainless steel options include 429 stainless and 304 stainless. For winding materials we offer aluminum and copper conductors.

**Q. What standard colors do you offer?**

A. Our standard build finish color for pad mounted transformers is Munsell™ 7GY 3.29/1.5 Pad-Mount Green. We do have other standard finishes available on request, including: Munsell™ 9GY 1.5/2.6 Canadian Green, Munsell™ 5BG 7.0/0.4 Light Grey (ANSI #70), Grey (ANSI #61), Munsell™ 10bg 6/1 Blue Grey, Munsell™ 10bg 6/1 Steel Blue, Munsell™ N 9/ Safety White, Federal Standard Desert Tan FS595B-33446, Federal Standard Eagle Feather Tan FS-595-23578, and Federal Standard Tobacco Brown FS595C-30108. If you need a color not listed here, please contact us.

**Q. What labeling is on the transformer?**

A. Standard labeling includes external stenciling of the KVA, stenciling of high and low voltages, non-PCB sticker, "Mr. Ouchy" warning label, and stainless steel riveted nameplate. Additional labeling to your specifications can be provided at request.

**Q. Can this transformer be customized?**

A. Yes, Larson Electronics allows for customization of all transformers. Please send customization requests to sales@larsonelectronics.com. If you have an engineered specification or engineered drawings, please provide those at the time of request.

**Q. What is the warranty of this transformer?**

A. 12 months from point of connecting electrical service to the transformer or 18 months from point of ordering, whichever comes first.

**Q. Where is the detailed dimensional drawing for this unit?**

A. We can provide a feature drawing that shows accessories and estimated form factor. Due to the variety of options and varying voltages, an exact dimensional drawing for the specific unit you have ordered is not available until after purchase and engineering has completed the drawing for your sales order. We do not offer completed detailed engineered drawings before purchase. The feature drawings are detailed enough for concrete pad designs and preliminary engineering site designs.

**Q. Does my primary and secondary voltage matter for a transformer?**

A. Yes, this matters greatly. For primary voltage, most transformers will be equipped with a tap changer for small primary voltage changes due to voltage drop for losses experienced in the transmission line. Some transformers will be equipped with dual voltage primaries with a voltage selector switch to choose which voltage to operate the transformer on. In both cases, these are designed to provide a steady output voltage. It is very important to confirm what voltage your primary voltage being delivered from the utility provider and what the required electrical voltage for the building or house is. You cannot only provide the KVA size, or the abbreviated primary voltage as there is not standardized voltage across the country and each region can be different. Once manufacturing has started, these cannot be changed.

**Q. What is required for mounting this transformer?**

A. For mounting requirements, please see the Concrete Pad document hyperlinked on the spec sheet and seen on the product page.

**Q. What accessories are included?**

A. Temperature gauge, oil level gauge, pressure/vacuum gauge, tap changer, load break switch, surge arrestors, fill plug, and drain plug are included standard. Gauges can be offered with auxiliary dry form contacts on request. Please review specifications for all accessories included with this specific unit.

**Q. What secondary connectors are included?**

A. NEMA spade connectors are included standard for live front secondary connections, and eblow connectors are included standard for dead front secondary connections. The specific hole quantity and hole spacing are referenced on preliminary

drawings and in the specifications.

**Q. What type of surge arrestors are included?**

A. Elbow surge arrestors are included with standard builds if specified that surge arrestors are included (check specifications). Wall mounted surge arrestors can be configured upon request.

**Q. Are primary eblows included with purchase?**

A. Primary mating elbows that match the bushings the transformer is configured with are included with purchase for standard units.

**Q. What primary connectors are included with this transformer?**

A. We offer elbow connectors standard for dead front primary transformers. 200-amp load break well bushings with inserts and elbows are standard up to 500 KVA. 600-amp dead break integral bushings and elbows are standard for 500 KVA through 3750 KVA. 900 amp dead break integral bushings and elbows are standard for units above 3750 KVA. We can change the standard bushing to a higher or lower amperage upon request providing the primary amperage does not exceed the amperage rating of the bushing.

**Q. What types of transformer protection are available?**

A. For over-current protection, Larson Electronics offers Fuses, breakers and interrupters. For over-voltage protection, Larson Electronics offers arresters. Larson Electronics can provide both Primary and Secondary protection equipment.

**Q. I plan to utilize this transformer for a solar or green energy related project to back feed the grid, can this unit be reverse fed for providing electric back to the utility grid?**

A. We offer a line of transformers for step up / step down operation that is designed for solar and renewable energy applications. Larson Electronics utilizes a R designation of R3 and R4 for these applications. Our standard R2 and R7 models are not designed for step up operation for reverse feeding and should not be utilized for these applications.

**Q. Do you have to ground this transformer?**

A. In most cases the enclosure of the transformer is grounded for safety reasons. However, a transformer will function properly without being grounded. Be sure to research all grounding requirements for your specific application against the NETA and NEC as well as any local electrical codes.

**Q. How many BTU's of heat does a transformer generate?**

A. The heat a transformer generates is dependent upon the transformer losses. To determine air conditioning requirements multiply the sum of the full load losses (obtained from factory or test report) of all transformers in the room by 3.41 to obtain the BTUs/hour. For example: A transformer with losses of 2000 watts will generate 6820 BTUs/hour.

**Q. What is the difference between copper and aluminum windings inside the transformer?**

A. Transformers wound with aluminum or copper wire have similar losses and performance. The choice of using copper or aluminum windings depends upon the application and the individual preferences. The type of winding material does not affect the transformer's reliability. A transformer's life is defined by the life of its insulation system.

**Q. What is the difference between Dead Front and Live Front?**

A. Live-front: The voltage-carrying parts are exposed. Live-front terminations have high voltage connectors, arresters, or fuses are exposed to the operator after cabinet has been opened. Dead-front: Often referred to as dead-front bushings. Safety is enhanced as there are no current-carrying parts exposed to the operator. For overhead distribution transformers and underground submersible transformers, live front is common. For pad mount transformers, the primary is typically dead front and the secondary is live front. Protection barriers can be added to live front pad mounted transformers

**Q. What is the difference between Loop Feed and Radial Feed?**

A. Radial feed Transformers will have three high voltage bushings (H1, H2, and H3). There is one bushing for each phase to allow for the incoming high voltage cables. On Wye and Grounded Wye connected Transformers, there will also be an H0 bushing. Loop feed Transformers will have six high voltage bushings (H1A, H2A, H3A, H1B, H2B, and H3B). There are two bushings for each phase. This allows the customer to connect all of their Transformers in a loop configuration. It will also allow the customer to bring two feeds to the Transformer. A four position switch can be used to switch between the A feed and the B feed.

**Q. What is the lifespan of a transformer?**

A. The average lifespan of a liquid filled transformer is 25 years. Many transformers will survive past the 25 year mark and are still in service for up to 35 years.

**Q. Is this transformer UL Listed? Is this transformer CSA Listed?**

A. By default, no. The majority of medium voltage transformer installations do not require certification by a Nationally Recognized Testing Laboratory (NRTL) unless being installed inside a building. Medium voltage equipment is built to and

complies to ANSI, ASTM, DOE, IEEE, and NETA standards. UL is one of multiple NRTLs per OSHA certification for testing facilities for USA standards. CSA is one of multiple NRTLs per Canada certification standards. For an additional fee, we can submit your order for NRTL testing after completion of build. This testing service is per order, requires payment of testing fees, and will increase lead time.

**Q. What are the transformer ratings?**

A. IEEE Std C57.12.20 (Overhead Type), IEEE Std C57.12.34 (Three-Phase Pad-Mounted Compartmental), IEEE Std C57.12.38 (Single-Phase Pad-Mounted), IEEE Std C57.12.36 (Distribution Substation Transformers). For more detailed list of standards, please see the ASTM Certificate 1 link.

**Q. Do Larson Electronics transformers contain PCB?**

A. All dry-type and liquid filled transformers manufactured by Larson Electronics are PCB (polychlorinated biphenyl) free at the time of shipment. Mixtures of polychlorinated biphenyls (PCB's) were banned commercially for use as transformers cooling fluids in 1977 due to being toxic, bio-accumulative, not at all biodegradable, and difficult to dispose of safely. None of Larson Electronics transformers contain PCB and only use PCB-free fluids.

**Q. What is the difference between FR3 fluid and biodegradable fluid?**

A. Envirotemp FR3 is a brand name of biodegradable ester oils made by Cargill. Cargill is not the only manufacturer of biodegradable ester fluids used for cooling liquid filled transformers. Larson Electronics stocks RAPO biodegradable fluid that exceeds testing for ASTM D6871. Cargill Envirotemp FR3 can be used in substitution of the standard biodegradable fluid. This substitution will increase cost and lead times.

**Q. What is the difference between mineral oil (ONAN) and biodegradable fluid (KNAN)?**

A. Mineral oil has a flash point of 147-165°C. Biodegradable insulation fluids have a higher flash point up to 350°C. Using biodegradable fluids reduce the risk of potential fire due to the transformer overheating. Utilizing biodegradable fluids extends the lifespan on the transformer due to better insulation, higher flash point, better moisture resistance, and higher maximum voltage breakdown points over mineral oils.

**Q. What types of transformer liquids does Larson Electronics use?**

A. Larson Electronics offered mineral oil fluid (ONAN) and biodegradable fluid (KNAN). On request we can provide brand name FR3 fluid or other brand name fluids for additional cost and lead time. All fluids offered by Larson Electronics are non-PCB containing fluids.

**Q. Does this transformer comply with (insert utility provider) specifications?**

A. Larson Electronics utilitizes a dedicated R designation in the part number for specific build designs. R1-R10 are internal build designs. Utility specific builds begin at R11. If the part number contains R2, R5, R6, R7, R8, or R9 the unit may comply with a specific local utilty for primary and secondary voltages but may not comply for equipment connections, included accessories, labeling, or barcoding. Units that comply with a specific utility will have reference to the utility company that the unit complies with, and include the utility's internal part number and utility's specification standard if applicable. If you are unable to find the part number that meets your local utility specifications, please contact us and we will assist in crossing the correct unit for you.







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**Product ID: 301546**

**Export Control Classification Number (ECCN):** EAR99

Links (Click on the below items to view):

- **ANSI Certificate 1**
- **ANSI Certificate 2**
- **ASTM Certificate 1**
- **Catalog Page - Product Series**
- **FCC Certificate (Federal Communications Commission, USA)**
- **Internal Component Spec Sheet 3**
- **MSDS (Material Safety Data Sheet**
- **Operations Manual**
- **HigResPic1**
- **HigResPic2**
- **HigResPic3**
- **HigResPic4**
- **HigResPic5**
- **HigResPic6**
- **Video1**
- **Video2**
- **ISO 9001 Certification**
- **Business Certificate**
- **Shipping Time Map**