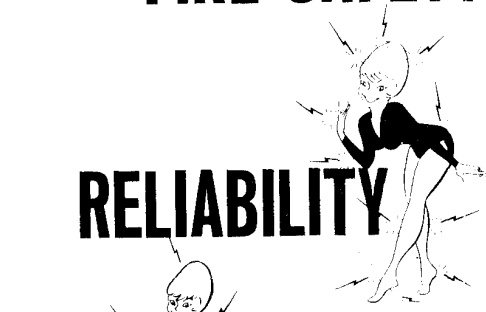


when you want

FIRE SAFETY



RELIABILITY



MINIMUM MAINTENANCE

specify

ASKAREL-TYPE

transformers

Monsanto

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CHECK DEPENDABILITY!

CHECK THE COST!

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Sometimes a "must" ...but often preferred by electrical engineers who know!

Askarel-type transformers have served industry, institutions, commercial housing, the military, electric utility companies and electric railroads safely, reliably, economically . . . for over 30 years.* They are supplied built to exact specification by all major electrical manufacturers. But only a relatively few engineers and electrical architects have dug into chemistry to learn WHY the askarel transformer is so fire safe, so reliable in operation, requires so little maintenance. Not too many electro-technologists know that askarel transformers (even when they cost a little more compared KV for KV with mineral oil transformers) can actually save money on the installation as a whole, and save money over years of use!

Askarel transformers are quite unique. And the "trade-secret" is *the fluid*. If you would like to join the "inner circle" of astute electrical architects and engineers who for the past 30 years have known just how, where, and why an askarel transformer should be installed . . . just check the facts (and factors) in the following few pages.

*Monsanto has manufactured and supplied askarel fluids since the askarel-type transformer was first introduced. Askarel-type transformers were first made by General Electric in 1940. The askarel fluid insulation was supplied under the trade mark Pyranol. Other electrical manufacturers soon developed askarel units using various trade marks for the askarel fluid, such as Inerteen (Westinghouse), Chlorextol (Allis-Chalmers), Noflamol (Wagner Electric), Asbestol (Ametran Corp.), Saf-T-Kuhl (Kuhlman Electric). Many manufacturers, however, simply use the generic name, askarel.

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THE FIRESAFE LIQUID INSULATION THAT MAKES ASKAREL TRANSFORMERS YOUR BEST INVESTMENT!

Mineral-oil transformers can catch fire. Dry, open-type transformers can start a fire. Gas sealed transformers require pressure and their cost is high! But askarel transformers quietly handle their load, under surge and drop, delivering a steady power flow year after year.

The secret of this quiet, fire safe service is the askarel fluid . . . the finest liquid insulation that chemistry has developed.

Askarel fluid cannot be ignited by a blow torch! In addition, this dielectric liquid will not oxidize or sludge; will not attack or corrode metals; remains chemically stable when subjected indefinitely to temperatures at least as high as 150° C.

The unique values of the askarel-type transformers all stem from the chemical, electrical, and physical properties of the askarel fluids.

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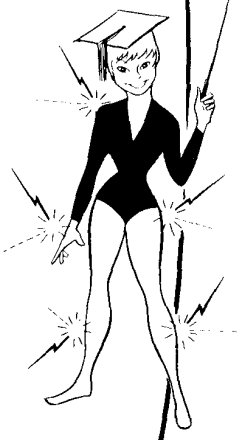
5 CHECKPOINTS FOR CHOOSING ASKAREL-TYPE TRANSFORMERS



- fire safety
- economy
- dependability
- easy maintenance
- low noise level

FIRE SAFETY

Askarel fluids, unlike mineral oil, cannot be ignited . . . even by the heaviest arc, such as might accidentally be caused by lightning. Equally important, askarel transformers cannot carry or add burning oil hazards to fires that may start from other causes. The fluid does not deteriorate when exposed to heat, hot metal, nor does it decompose over long use to accumulate electrically unstable contaminants. Since askarel fluid won't burn, and gases formed by arcing do not support combustion, the use of askarel transformers eliminates the possibility of fire and secondary explosion.

Fire safe askarel transformers are the choice of far-sighted engineers for hospitals, hotels, schools, institutions, underground networks, military bases, mines, shopping centers, electrical railroad systems, rocket sites.

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ECONOMY

Askarel type transformers cost about the same or very slightly more than open dry types, cost much less than sealed dry (gas) transformers. While askarel units cost up to 15% more than equal-capacity mineral oil units, this initial cost is only *part* of the economic picture: askarel transformers can usually be installed without the costly vaults, fire walls, or sprinkler systems required by safety codes for mineral oil units. Further savings accrue in the design of the power transmission system. Since askarel units can be placed in congested, closed areas without danger to workers, askarel units can be *close to the point of power* usage. (See Performance Comparison Table) In addition, fire insurance rates are usually lower when askarel units are used.

DEPENDABILITY

A properly designed and installed askarel transformer will give trouble-free service for a minimum of 30 years. Since their introduction in 1930, the manufacturers report finding the overall failure rate to be less than 0.5% for all units *under test and service conditions.* The Edison Electric Institute's last report (1956-1958) on their member utilities publishes the failure rate for askarel transformers as *0.13 per hundred banks per year!* Even these rare reported failures are found to be due to improper sealing that allowed moisture to enter. Modern design requirements for askarel transformer seals eliminates possible failure.

EASY MAINTENANCE

Askarel transformers are easiest to maintain! Most of the askarel transformers in service today have received little or no maintenance in decades of operation. Even the accumulation of relatively large amounts of non-ionic contaminants has little effect upon askarel's excellent dielectric strength. The only contamination that seriously affects the askarel's dielectric strength is water. Proper sealing banishes this source of contamination. Five simple periodic tests (three of them, visual) will check out the askarel insulation. Monsanto and the transformer manufacturers furnish guidance literature on this easy-to-follow maintenance. Unlike oil type transformers, with askarel units there is no chance of fluid oxidation or sludge formation, and therefore, less need for replacing the fluid.

LOW NOISE LEVEL

Askarel transformers operate quietly! Where open dry type transformers in office buildings, hospitals, schools and institutions require a sound suppressing room or locating far from point of use, askarel units are so quiet that no sound problem arises. Wherever a fire safe transformer is warranted, the askarel type unit operates at a significantly lower noise level than dry types and offers a significantly superior impulse rating over the dry type.

Askarel-Type Transformers Offer Five Important Advantages Over Other Type Transformers

Eliminate Fire Hazard	Proven Dependability
More Economical to Install and Operate	Less Maintenance, Easier Upkeep
	More Quiet Operation

CHECK DEPENDABILITY!

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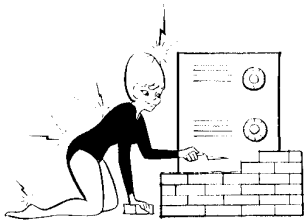
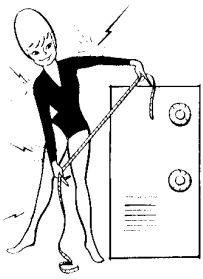
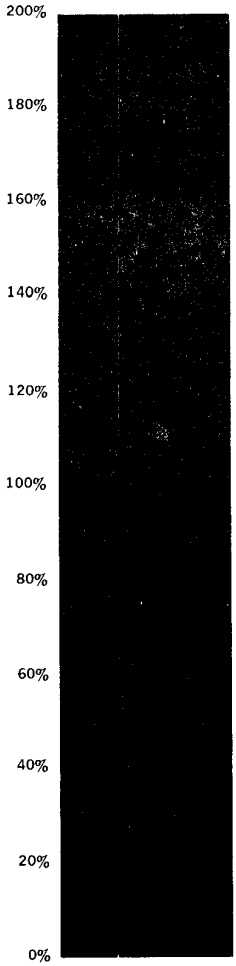
BASE UNIT CO









MINERAL OIL

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ST & ADDITIONAL EXPENSE COMPARISON

Little or no additional installation cost; no additional measures needed for fire and explosion safety.

(3-18% more than mineral oil)



ASKAREL

Little additional installation cost BUT: cannot be used where there is excessive atmospheric dust, dirt, moisture, or where high noise level will cause interference.

(2-8% more than mineral oil)



OPEN DRY TYPE

Little additional installation cost BUT: original unit cost is higher than any other type.



SEALED, GAS DRY TYPE

CHECK THE COST!

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Here are

four important reasons

why engineers choose askarel transformers!

SAFETY!

Freedom from fire and secondary explosion.

USE FLEXIBILITY!

Tightly sealed askarel transformers can be used in atmospheres contaminated with dust, lint, corrosive vapors and moisture.

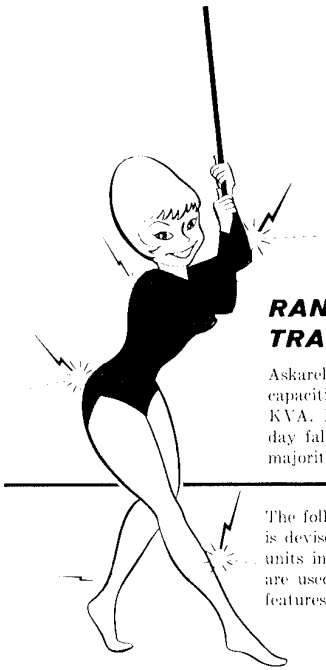
DEPENDABILITY!

Askarel fluid does not oxidize or sludge.

LOW NOISE LEVEL!

Askarel transformers can be installed close to power supply outlets without causing objectionable noise.

FOUR IMPORTANT ADVANTAGES FOR INDOOR USE, AND FOR OUTDOOR INSTALLATIONS, TOO!



RANGE OF ASKAREL TRANSFORMERS

Askarel transformers are available in all capacities, in size ratings exceeding 15,000 KVA. Most askarel transformers in use today fall in the 25 to 2,000 KVA range, the majority ranging between 100 and 1,000 KVA.

The following transformer comparison chart is devised to show the economics of askarel units in the 25 to 2,000 KVA range, which are used primarily for their superior safety features.

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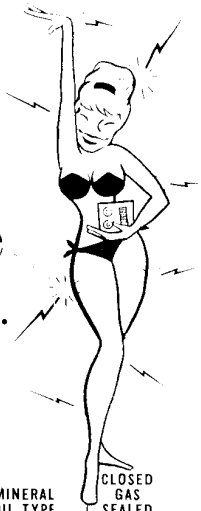
compare the performance advantages...



	ASKAREL	OPEN DRY TYPE	MINERAL OIL TYPE	CLOSED GAS SEALED
Transmission & Service Costs	NORMAL RANGE	HIGH	HIGH	HIGH
Supplemental Installation Costs	NEGLIGIBLE	HIGH (if noise damping or shielding from atmosphere, contamination & water is needed)	HIGH (when used indoors, requires vaults, fire walls, sprinklers and noise damping)	NEGLIGIBLE
Operational Dependability	EXCELLENT	Affected by corrosive atmosphere, moisture, water flooding, dirt and dust.	GOOD	EXCELLENT
Amount of Maintenance Required	LITTLE OR NONE	CONSIDERABLE	FAIR due to oil's tendency to degrade in service.	NONE
Operating Noise Level	VERY LOW	HIGH	MEDIUM	HIGH
Impulse Levels	HIGH	LIMITED	HIGH	LIMITED
Safety from Fire	EXCELLENT AND COMPLETE	FAIR can cause ignition	POOR can cause ignition and propagate fire	FAIR

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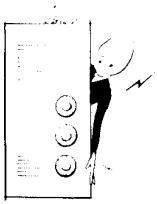

HERE'S WHERE AN ASKAREL TRANSFORMER IS YOUR BEST CHOICE

INDUSTRIAL LOAD CENTERS

In factory areas where maximum safety from fire is required and atmosphere contamination may prevail.



UTILITY NETWORKS

Where location underground or above the surface requires protection from water and other elements, and where maximum safety against fire is needed.

INSTITUTIONS AND OFFICE BUILDINGS

In schools, hospitals, government buildings, hotels, airports, shopping centers, sport stadiums, etc., where maximum safety and lowest noise levels are required.

WATER FRONTS AND BOAT DOCKS

Where fire and weather resistance are the prime requirements.

ELECTRIC RAILROAD SYSTEMS

Transformers on electric trains and throughout the system require maximum safety features and assurance against faulty operation due to weather exposure.



MISSILE SITES

Where surface and underground structures demand reliable performance and complete protection from weather, fire and explosion.

CONGESTED OUTDOOR INSTALLATIONS

Where safety from fire and explosion are required for crews working close to transformer units.

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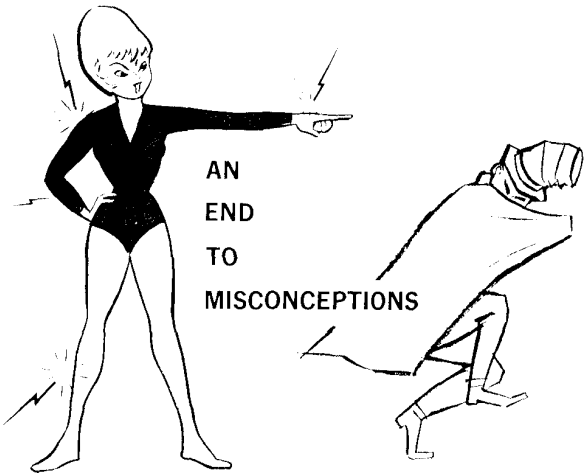

AN END TO MISCONCEPTIONS

Some engineers who have had no opportunity to acquire actual operating experience with askarel transformers and who have received little information about them sometimes harbor mistaken opinions that are contrary to the facts. Here are the three misconceptions that, however infrequent, have been occasionally encountered:

"Askarel fluids are 'poisonous.'" The facts: askarel fluids have been manufactured, handled, and used for over 30 years without encountering toxic or ill-effects. It is well accepted by transformer makers and utilities that askarel fluids are not hazardous when handled under standards of normal good housekeeping and the ordinary personal precautions used with other inert industrial materials.

"Askarel transformers can explode." The facts: there is no instance, in the whole use history of askarel units, of secondary explosion because gases formed by arcing are non-explosive and non-combustible! Even under strong arcing, the possibility of primary explosion in a properly designed and escape-vented askarel transformer is very remote. Modern design features, such as cable connection seals, completely protect askarel transformers from possible explosion.

"Askarel fluids run a high power factor." The facts: Engineers experienced with askarel transformers know that it *is normal* for an askarel transformer to show a higher power factor than a mineral oil unit.

It is technically unsound to compare the insulating efficiency of oil and askarel by simply measuring power factor.
A high power factor in mineral oil *is* cause for alarm; BUT it is normal for askarel to show a power factor as high as 20 to 80 per cent at 100°C, 60 cycles (2-8% at 20°C); with absolutely no danger of efficiency loss or impairing normal operation.

NOTE: The most significant and reliable measurement of transformer askarel is its DIELECTRIC STRENGTH. Askarel will maintain its high dielectric strength unless there is significant moisture contamination or breakdown of the fluid from an unusually severe exposure to arc.

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Askarel fluids (both Inerteen and Pyranol type) are manufactured by Monsanto and shipped promptly to users anywhere in the world. Askarel transformer fluids, unlike naturally formed oils, are manufactured and quality-checked for consistency and shipped with an extreme care that is given to few industrial materials. This means askarel fluids can be depended upon to be uniform and provide the optimum service of any liquid insulation.

Operating with askarel units is the safest, easiest, often lowest cost way to distribute electrical power. Monsanto will be happy to send you a copy of the pamphlet "Care and Grooming of Askarel Transformer Fluid" or request a copy from the transformer manufacturer of your choice. And if you do . . . ASK HIM to check the facts on askarel transformers described on the preceding pages.

Monsanto



MONSANTO CHEMICAL COMPANY
Aviation and Special Fluids Department
Organic Chemicals Division
St. Louis 66, Missouri

Askarel transformer fluids can be ordered directly from any one of these Monsanto sales service centers

Atlanta

Boston

Chicago

Cincinnati

Cleveland

Detroit

Houston

Los Angeles

Minneapolis

New York

Pittsburgh

St. Louis

San Francisco

Seattle

Syracuse

Wilmington

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