

شركة السمرا لتوليد الكهرباء (م.خ.م)

TENDER 98/2026

Fire Resistant Hydraulic Oil (Electro-Hydraulic Control System Fluid Oil For Steam Turbines).

QTY : 8 BARREL

AS ATTACHED SPECIFICATIONS



II. CHEMICAL REACTIVITY

EHC DOES NOT REACT WITH AIR TO ANY APPRECIABLE EXTENT AT ROOM TEMPERATURE.

EHC WILL SLOWLY HYDROLYZE WITH WATER AT ELEVATED TEMPERATURES. THIS PROCESS IS ACCELERATED BY THE PRESENCE OF ACIDS OR ALKALIS. NO VIGOROUS REACTIONS ARE ANTICIPATED WITH COMMON ACIDS, ALKALIS, OXIDIZING, AND REDUCING AGENTS UNDER AMBIENT CONDITIONS.

III. STABILITY

EHC IS HIGHLY STABLE. IT IS NOT SHOCK SENSITIVE, WILL NOT POLYMERIZE, AND REQUIRES NO SPECIAL STORAGE FACILITIES.

IV. FIRE HAZARDS

EHC IS DESIGNED TO BE USED AS A FIRE-RESISTANT HYDRAULIC FLUID AND LUBRICANT. FIRES SHOULD SELF-EXTINGUISH ONCE THE SOURCE OF IGNITION IS REMOVED.

V. FIRE FIGHTING TECHNIQUES

WATER FOG, DRY POWDER OR CARBON DIOXIDE MAY BE USED. HIGH TEMPERATURE SOURCES OF IGNITION SHOULD BE REMOVED BY COOLING WITH WATER OR OTHER MEANS WHERE PRACTICAL. PRODUCTS OF COMBUSTION ARE NOT DANGEROUSLY TOXIC BUT PRECAUTIONS SHOULD BE TAKEN TO AVOID INHALATION. IN CONFINED SPACES WHERE FRESH AIR FLOW IS LIMITED, FRESH AIR OR OXYGEN MASKS SHOULD BE EMPLOYED.

VI. HEALTH HAZARD DATA

ANIMAL STUDIES INDICATE THAT EHC IS PRACTICALLY NONTOXIC WHEN ADMINISTERED ORALLY IN SINGLE DOSES AND IS NOT IRRITATING TO THE SKIN OR EYES.

NO NEUROTOXIC EFFECTS HAVE BEEN REPORTED IN HUMANS FROM USE OF THIS PRODUCT, BUT IT COULD BE A HAZARD BASED UPON THE RESULTS OF CHICKEN TESTS.

1. INGESTION

BASED ON ANIMAL STUDIES, INGESTION OF LARGE DOSES MAY PRODUCE SYMPTOMS OF NONSPECIFIC IRRITATION OF THE GASTRO-INTESTINAL TRACT: NAUSEA, VOMITING, CRAMPS AND DIARRHEA.

2. EYE EFFECTS

STUDIES WITH RABBITS INDICATE THAT IRRITATING TO THE EYES.

EHC IS NOT

3. DERMAL EFFECTS

NO SIGNS OF IRRITATION WAS OBSERVED WHEN WAS APPLIED TO THE BARE SKIN OF RABBITS.

EHC

4. INHALATION

NO HEALTH EFFECTS ARE ASSOCIATED FROM INHALATION OF EHC. INHALATION OF HIGH CONCENTRATIONS OF VAPORS, MISTS OR SPRAYS MAY PRODUCE NONSPECIFIC IRRITATION OF THE UPPER RESPIRATORY TRACT.

5. THRESHOLD LIMIT VALUE

NONE ESTABLISHED FOR

EHC.

6. WARNING PROPERTIES

NONE.

TEST LIMITS FOR TS . . . EHC

VISCOSITY: MINIMUM 200
 MAXIMUM 240

THIS IS A TEST OF THE FLUIDITY OF FYRQUEL EHC AT 100°F AND IS IMPORTANT TO PUMP LIFE AND SYSTEM RESPONSE TIME. EXPERIENCE HAS SHOWN THAT FLUID OUT OF THIS RANGE HAS PROBABLY BEEN CONTAMINATED WITH A MINERAL OIL OR FUEL.

MINERAL OIL CONTENT: 4% MAXIMUM

RECORDINGS OF BELOW 1% IN THIS CATEGORY ARE GENERALLY THE RESULTS OF HYDROCARBON EXTRACTION FROM PIPE DOPES, SEALS OR PACKINGS. CONTAMINATION ABOVE 1% MAY INDICATE CONTAMINATION FROM AN EXTERNAL SOURCE. A CONCENTRATION ABOVE 4% IS POTENTIALLY HARMFUL TO THE SYSTEM DUE TO THE LOWERING OF FIRE-RESISTANCE AND INCOMPATIBILITY WITH SOME MATERIALS OF CONSTRUCTION.

WATER CONTENT: MAXIMUM 0.15%

NEW HYDRAULIC FLUID MAY CONTAIN AS HIGH AS 0.10% MOISTURE. A READING ABOVE 0.15% INDICATES THAT WATER IS ENTERING THE SYSTEM FROM AN EXTERNAL SOURCE, SUCH AS AN INTERCOOLER. CORRECTIVE MEASURES SHOULD BE TAKEN TO REMOVE THE EXCESS WATER AND TO ELIMINATE THE SOURCE OF THE LEAK. HIGH WATER CONTENT CAN LEAD TO INCREASED PUMP WEAR AND HYDROLYSIS OF THE FYRQUEL EHC TO FORM CORROSIVE ACIDS.

NEUTRALIZATION NO.: MAXIMUM 0.50 mgKOH/g

AN OPERATIONAL MAXIMUM OF 0.30 mgKOH/g SHOULD BE SET ON NEUTRALIZATION NUMBER WITH AN UNDERSTANDING THAT 0.50 mgKOH/gm

CAN BE TOLERATED. FULLERS EARTH FILTRATION MAY BE USED TO CONTROL AND REDUCE THIS VALUE. A HIGH NEUTRALIZATION NUMBER COULD INCREASE VALVE EROSION.

CHLORINE CONTENT: MAXIMUM 150 PPM

A MAXIMUM OF 150 PPM CHLORINE, BY X-RAY EMISSION METHOD, CAN BE TOLERATED IN OPERATIONAL SYSTEMS. HIGHER CHLORINE VALUES HAVE BEEN ASSOCIATED WITH SERVO-VALVE EROSION.

PARTICLE COUNT: MAXIMUM CLASS 3 - SAE A-6D

5 TO 10 MICRONS	24,000	PARTICLES/100	ML.
10 TO 25 MICRONS	5,360	"	"
25 TO 50 MICRONS	780	"	"
50 TO 100 MICRONS	110	"	"
OVER 100 MICRONS	11	"	"

FLUID CLEANLINESS, IN TERMS OF PARTICLE DISTRIBUTION, HAS BEEN SHOWN TO BE OF UTMOST IMPORTANCE WHEN OPERATING SERVO-VALVES.

RESISTIVITY: MINIMUM 5.0×10^9 OHM/CM

RESISTIVITY IS A TEST OF THE FLUID'S RESISTANCE TO CONDUCT ELECTRICAL POTENTIALS AND THUS PROTECT THE VALVES FROM ELECTRICAL EROSION.

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SAMPLING FREQUENCY:

THE EFFECTIVENESS OF THE / PROGRAM IS GREATLY INCREASED IF A REGULAR SAMPLING INTERVAL IS SET UP. EXPERIENCE HAS SHOWN THE FOLLOWING SAMPLING FREQUENCY TO BE THE MOST EFFECTIVE.

TURBINE START-UP	- SAMPLE BEFORE AND AFTER START-UP
1ST MONTH OF OPERATION	- WEEKLY
1ST YEAR OF OPERATION	- EVERY MONTH
2ND YEAR OF OPERATION	- EVERY 2 MONTHS
3RD & LATER YEARS	- EVERY 4 MONTHS

SAMPLE BOTTLES:

PLEASE SEND ALL SAMPLE BOTTLE REQUESTS TO:

STAUFFER CHEMICAL COMPANY
SPECIALTY CHEMICAL DIVISION
GALLIPOLIS FERRY, WV 25515
ATTN: FUNCTIONAL FLUID LAB

UPON RECEIPT OF A SAMPLE FOR ANALYSIS, STAUFFER WILL ARRANGE TO HAVE A REPLACEMENT KIT SENT FOR FUTURE SAMPLING.

SAMPLING:

TWO SAMPLES SHOULD BE DRAWN INTO SPECIAL "CLEAN BOTTLES" PROVIDED BY STAUFFER CHEMICAL COMPANY. CARE SHOULD BE TAKEN NOT TO EXPOSE THESE BOTTLES TO ANY CONTAMINATION OR TO ALLOW THEM TO STAND UNCOVERED. SAMPLES CAN BE TAKEN FROM THE SAMPLING VALVE IN THE AUXILIARY FILTER SYSTEM. TWO SEPARATE SAMPLES ARE REQUIRED DUE TO THE PARTICLE COUNT TESTING.

THERMODYNAMIC VALUES

SMOOTH SPECIFIC HEAT (CAL/G DEG. C)

0°C	0.3523
38°C	0.3762
100°C	0.4101

THERMAL CONDUCTIVITY (CAL-CM/SEC/CM³/DEG. C)

40°C	3.04×10^{-4}
94°C	3.04×10^{-4}
146°C	2.95×10^{-4}

LATENT HEAT

24.7 K CAL/MOLE
60.3 CAL/G
108.8 BTU/POUND

VAPOR PRESSURE (MMHg ABS)

420°F	0.08 MM Hg ABS
430°F	0.50 MM Hg ABS
450°F	1.20 MM Hg ABS

BULK MODULUS

TEMPERATURE °F	PRESSURE INCREMENTS, PSI			
	0-5,000	5,000-10,000	10,000-15,000	15,000-20,000
100	531,000	581,000	632,000	680,000
150	467,000	565,000	569,000	638,000
200	422,000	463,000	510,000	566,000

WEAR TEST

"FALEX" LUBRICATION TEST

WEAR TEST	0.0105 SCAR WIDTH, INCHES
EXTREME PRESSURE TEST	
TRANSITION LOAD	1,500 POUNDS
TRANSITION PRESSURE	101,000 PSI

"TIMKEN" LUBRICATION TEST

WEAR TEST	1.25 SCAR WIDTH, MM
EXTREME PRESSURE TEST	
O.K. LOAD	55 POUNDS
PRESSURE AT O.K. LOAD	26,250 PSI

HYDRAULIC FLUID WEAR TEST (ASTM D 2271-66)

1,000 PSI - 1,000 HRS.	
WEAR ON RING AND VANES	
	TOTAL 0.0322 GRAMS

2,000 PSI - 1,000 HRS.	
WEAR ON RING AND VANE	
	TOTAL 0.0820 GRAMS

MANY YEARS OF ACTUAL FIELD USAGE TOGETHER WITH TEST RESULT HAVE PROVED THE COMPATIBILITY OF METALS WITH FYRQUEL HYDRAULIC FLUIDS.

EHC HAS A NEGLIGIBLE EFFECT ON STEEL, BRASS, ZINC, ALUMINUM, CADMIUM, MAGNESIUM, AND COPPER WHEN TESTED IN ACCORDANCE WITH THE MILITARY SPECIFICATION MIL-H-19457B. THE FOUR METALS NAMED IN THE CORROSION TEST REQUIREMENT OF THIS SPECIFICATION - STEEL, BRASS, ZINC, AND ALUMINUM - WERE PREPARED AND TESTED UNDER THE CONDITIONS SET FORTH IN PARAGRAPH 4.4.6.1. OF MIL-H-19457B. SAMPLES OF THE OTHER THREE METALS WERE INCLUDED IN THE SAME SERIES OF TESTS. THE SAMPLE 1/4 x 7/8 x 2 INCHES, WERE IMMersed IN 300 ML OF OIL IN SEALED GLASS JARS AND PLACED IN AN OVEN HEATED TO $130 \pm 2^{\circ}\text{F}$ FOR SEVEN DAYS. THE WEIGHT CHANGE IN EVERY CASE WAS WELL WITHIN THE SPECIFICATION LIMIT OF 0.2 MG/SQ.CM. NO VISUALLY EVIDENT PITTING OR ETCHING RESULTED AND THERE WAS NO STAINING EXCEPT FOR SLIGHT BLACK STAINS ON MAGNESIUM.

METAL

EHC

STEEL	NO CHANGE
BRASS	NO CHANGE
ZINC	NO CHANGE
ALUMINUM	+0.032
CADMIUM	+0.088
MAGNESIUM	+0.037
COPPER	NO CHANGE

FIRE-RESISTANT HYDRAULIC FLUID

1. PHYSICAL AND CHEMICAL PROPERTIES

CHEMICAL COMPOSITION	TRI-ARYL PHOSPHATE
PHYSICAL STATE (77°F, 1 ATM)	LIQUID
SPECIFIC GRAVITY, 60°/60°F	1.12-1.21
BOILING POINT, °F	735
ODOR	VERY SLIGHT
POUR POINT, °F	0
WATER SOLUBILITY (G/100 ML)	1
VISCOSITY RANGE, 100°F, SUS	208-230
FLASH POINT, °F, COC	455
FIRE POINT, °F, COC	665
AUTOIGNITION TEMPERATURE, °F	1,100

EMERGENCY TELEPHONE No. (304) 675-1150 DAYS
675-1154 NIGHTS