

# LABORATORY TEST



*Compress Shield® – For Maximum Performance of Your Air Conditioning and Refrigeration Systems*

## **COMPRESS SHIELD®**

Advanced Refrigeration Technology

**850 Ridgelake Blvd. Suite222  
Memphis, TN. 38120  
Ph: (901) 842-5550**

## COMPRESS SHIELD / SEAL MATERIAL COMPATABILITY TESTING

**LAB:** AutoResearch Laboratories Inc. (708) 210-9989

**TEST CONDITIONS:** (ASTMD-471) 150°C for 166 hours.

**MATERIALS TESTED:** Parker Hannofin C873-70 Neoprene CR and Parker Hannofin N674-70. Low Swell Nitrile NBR (Parker Hannofin's two most widely used seal materials).

**TEST RESULTS:** Seal material samples were exposed to Suniso 3GS oil, and the same Suniso 3GS oil plus **COMPRESS SHIELD®**. A comparison of the % volume change in the material (swell test) was subsequently performed.

	<u>Original</u> <u>(Untreated)</u>	<b>COMPRESS</b> <b>SHIELD® +</b> <u>Suniso 3GS</u>	<u>Reference</u> <u>Suniso 3GS</u>
Neoprene CR % volume change (avg.)	0	22.58	31.83
Low Swell Nitrile NBR	0	12.4	65.70

**CONCLUSIONS:** The introduction of **COMPRESS SHIELD®** to the Suniso 3GS oil reduced the potentially harmful swelling effect of the oil on both seal materials. The addition of **COMPRESS SHIELD®** reduced swelling in the Neoprene by 29%, and in the Nitrile by 81%. **COMPRESS SHIELD®** not only can be safely used, it provides life-extending benefits to these seal materials.

## OXIDATION RESISTANCE TESTING

**LAB:** Professional Service Industries. TAI/Faber Division  
(708) 449-0001

**TEST CONDITIONS:** Rotating Bomb Oxidation Resistance Test (ASTM D2272).

**MATERIALS TESTED:** Sample 1 – Suniso 3GS Refrigerant Oil  
Sample 2 – 95% Suniso 3GS Oil + 5% **COMPRESS SHIELD®**

**TEST RESULTS:** Oil samples were exposed to an oxygenated environment at 90 PSI and heated to 302°F. As oil samples absorb oxygen (oxidize), pressure drops. The longer a sample takes to drop 25 PSI, the more resistant the oil is to oxidation.

	<u>Time to Failure</u>
Sample 1 – Suniso 3GS Oil	14 minutes
Sample 2 – 95% Suniso 3GS Oil/5% <b>COMPRESS SHIELD®</b>	25 minutes

**CONCLUSIONS:** The introduction of **COMPRESS SHIELD®** to the Suniso 3GS oil increased the oil's resistance to oxidation by 78.5%. In a refrigeration system, increased resistance to oxidation provides extended wear protection for compressor components.

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## Thermal Stability Test

**LAB:** Dover Chemical Corporation. (330) 343-7711, 1-800-321-8805

**TEST CONDITIONS:** Isothermal Thermogravimetric Analysis (TGA)

**MATERIALS TESTED:** Sample A: Capella Oil  
Sample B: Capella Oil (95%) + **Compress Shield®** (5%)

**TEST OBJECTIVE:** To determine if **Compress Shield®** increases the risk of forming volatile products such as hydrochloric acid in refrigeration oil.

**TEST METHOD:** Samples A and B were heated to 200° C and weight loss was monitored. Decomposition will result in weight loss as volatile products are formed.

**TEST FINDINGS:** There were no discernable differences between the two samples. It can be concluded that **Compress Shield®** does not adversely affect the thermal stability of refrigeration oil.

<b>Sample:</b>	Sample A	Sample B
<b>Material ID:</b>	Capella Oil	Capella Oil (95%) + <b>Compress Shield®</b> (5%)
<b>Description:</b>	Yellow Liquid	Yellow Liquid
TGA Analysis @ 200° C (N <sub>2</sub> )	<u>Sample A</u>	<u>Sample B</u>
% Percent Wt. Loss @ 5 min.:	5.244	5.273
@ 10 min.:	9.727	9.712
@ 15 min.:	13.18	13.16
@ 30 min.:	21.13	21.10
@ 60 min.:	31.81	31.86
<i>Note: % wt. Loss after ramp</i>	0.92	0.92

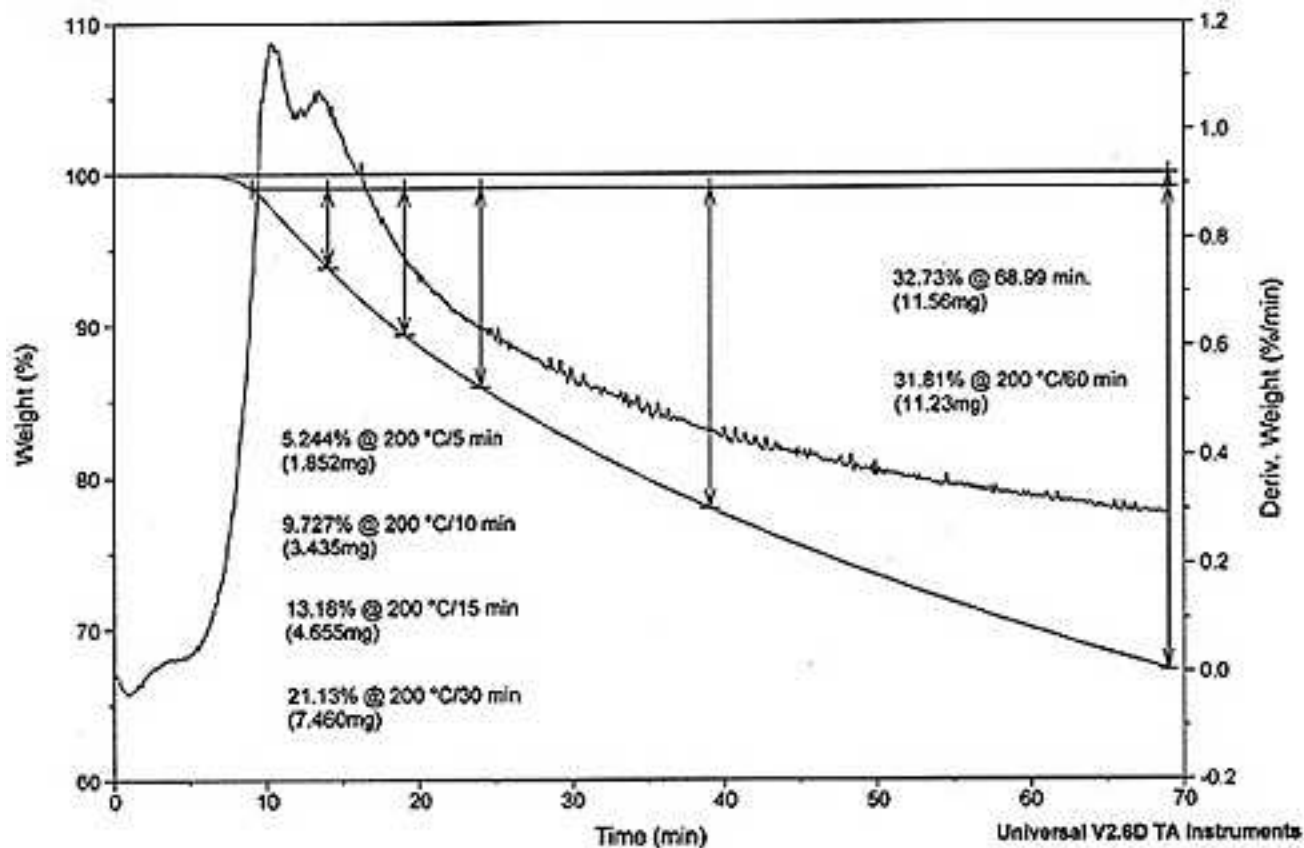
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## Thermal Stability Test: Graphical Results For Sample A

Sample: EA3730 A (WF-68 Capella Oil)  
Size: 35.3110 mg  
Method: STD\_TGA  
Comment: tga

TGA

File: C:\TAI\Data\TGA\Ea3730.001  
Operator: pjb  
Run Date: 16-Jul-02 14:20

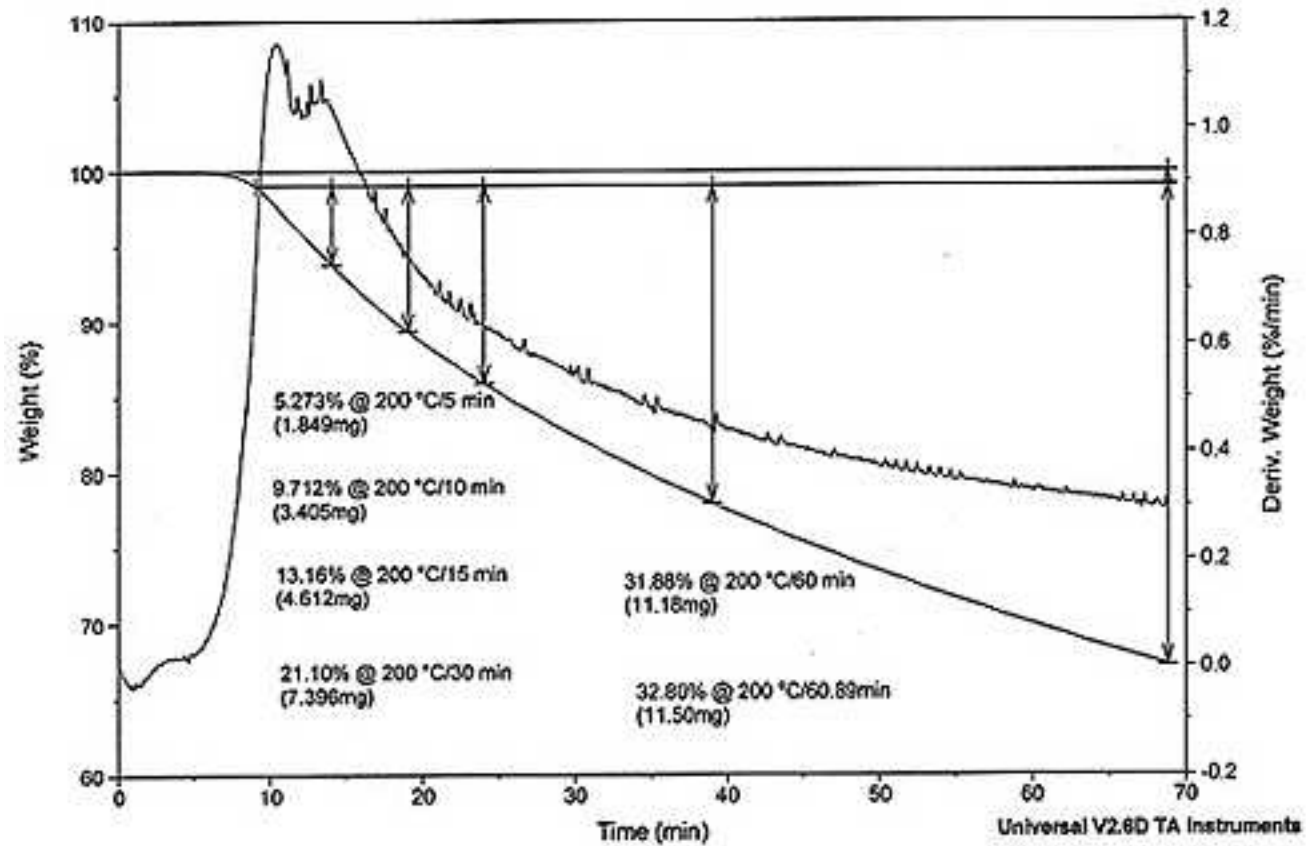


## Thermal Stability Test: Graphical Results For Sample B

Sample: EA3730 B (Oil 95%: 5% comshield)  
Size: 35.0580 mg  
Method: STD\_TGA  
Comment: tga Capella Oil : Compresahield

TGA

File: C:\TAI\Data\TGA\EA3730.002  
Operator: pjb  
Run Date: 16-Jul-02 16:54



## LUBRICITY EVALUATION

## FALEX PIN AND VEE BLOCK TEST RESULTS

SD-1: 100% SUNISO 3GS	SD-2: 95% SUNISO 3GS 5% COMPRESS SHIELD®
FAILURE @ 300 P.S.I.	300 500 1000 1500 2000 2500 3000 3500 4000 4500+ P.S.I.
SD-3: 100% CAPELLA WF	SD-4: 95% CAPELLA WF 5% COMPRESS SHIELD®
FAILURE @ 300 P.S.I.	300 500 1000 1500 2000 2500 3000 3500 4000 4500 + P.S.I.

\*MEASURED IN POUNDS  
 \*LOADING CAPACITY OF EQUIPMENT  
 Test Conducted by:  
**FALEX CORPORATION**  
 2055 Comprehensive Drive  
 Aurora, IL. 60505  
 (312) 851-7660

The Falex Corporation offers one of the most modern, fully-equipped friction and wear testing laboratories in the world. Falex has more than 50 years experience in the lubricant testing industry.

The Falex Pin and Vee Block Test measures a lubricant's load carrying capacity. It is performed according to ASTM D-3233-73 "Measurement of Extreme Pressure Properties of Fluid Lubricants (Falex Method)."

The test employs a steel pin rotated at 290 R.P.M. against two vee blocks to give a four-line contact. The pin and vee blocks are immersed in an oil sample through which Freon is bubbled to simulate compressor operating conditions. Load is applied to the rotating pin via the vee blocks until the oil sample fails. See the figure below for an exploded view of the arrangement.

