

**Tradename:** AC Dermal Respiratory Factor PF

**Code:** 20219PF

**CAS #:** 7732-18-5 & 8013-01-2

**Test Request Form #:** 811

**Lot #:** NC140218-A

**Sponsor:** Active Concepts, LLC; 107 Technology Drive Lincolnton, NC 28092

**Study Director:** Erica Segura

**Principle Investigator:** Meghan Darley

**Test Performed:**

Transepidermal Water Loss (TEWL) Assay

**Introduction**

An *in-vivo* study was conducted over a period of four weeks to evaluate the ability of **AC Dermal Respiratory Factor (DRF) Advanced PF** to enhance barrier function through reduction in Transepidermal Water Loss (TEWL). Results indicate that this material is capable of efficiently reducing TEWL which allows moisture retention.

**Assay Principle**

Transepidermal water loss is measured by the DermaLab Combo based on Nilsson's Vapor Pressure Gradient method. This method involves an open chamber with minimal impact on the skin, and therefore, a very low bias. Two temperature and humidity sensor sets are mounted in a chamber at different heights above the surface of the skin. The evaporation rate of the skin follows Fick's Law of Diffusion:

$$\text{Rate} = P \times [c_1 - c_2] / T$$

Where P = permeability coefficient of membrane, (c1-c2) = concentration gradient, and T = thickness of membrane).

**Materials**

**A. Equipment:** DermaLab Skin Combo (Transepidermal Water Loss Probe)

**Methods**

10 volunteers M/F between the ages of 23 and 45 and who were known to be free of any skin pathologies participated in this study. A DermaLab Combo was used to measure TEWL on the subject's volar forearms.

The instrument consists of a probe that is based upon the vapor gradient with an open chamber. This open chamber design maintains the free natural evaporation from the skin without interfering with the environment over the measurement area. This ensures unbiased and accurate readings. Operation of the water loss module is fully menu drive, allowing for pre-setting and standard deviation or measurement time. Baseline TEWL readings were taken on day one of the study.

Following initial measurements, all subjects were asked to apply 2 milligrams of each test material on their volar forearms. Measurements were taken immediately after application of the test materials and then weekly for four weeks. The test material consisted of 2% **AC Dermal Respiratory Factor Advanced PF** in a base lotion.

## Results

AC Dermal Respiratory Factor Advanced PF showed very effective moisture retention capabilities at a 2.0% concentration. Please note, each value is an average of three consecutive readings per test site.

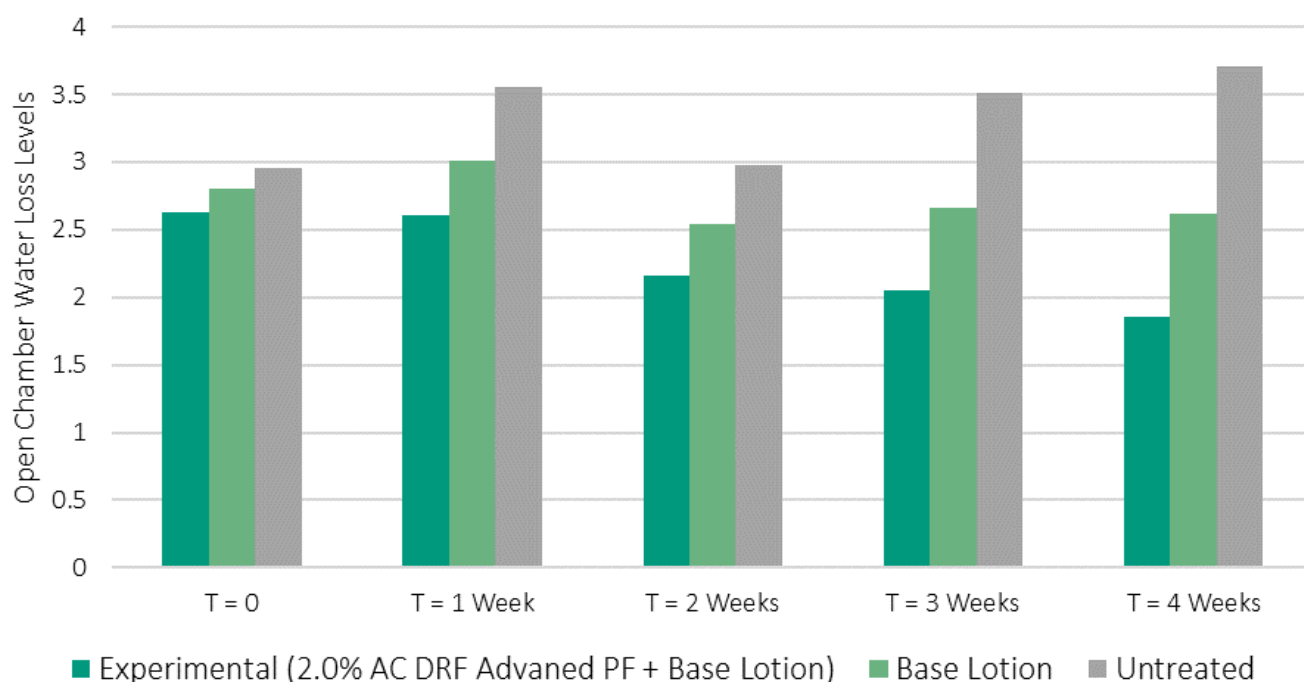
Averages	T = 0	T = 1 Week	T = 2 Weeks	T = 3 Weeks	T = 4 Weeks
Experimental (2.0% AC DRF Advanced PF + Base Lotion)	3	3	2	2	2
Base Lotion	3	3	3	3	3
Untreated	3	4	3	4	4

**Table 1.** Average Transepidermal Water Loss of Individual Test Sites

Percent (%) Change	T = 0	T = 1 Week	T = 2 Weeks	T = 3 Weeks	T = 4 Weeks
Base Lotion vs. Untreated	-5%	-15%	-15%	-24%	-29%
Experimental (2.0% AC DRF Advanced PF + Base Lotion) vs. Untreated	-11%	-26%	-28%	-42%	-50%
Experimental (2.0% AC DRF Advanced PF + Base Lotion) vs. Base Lotion	-6%	-13%	-15%	-23%	-29%

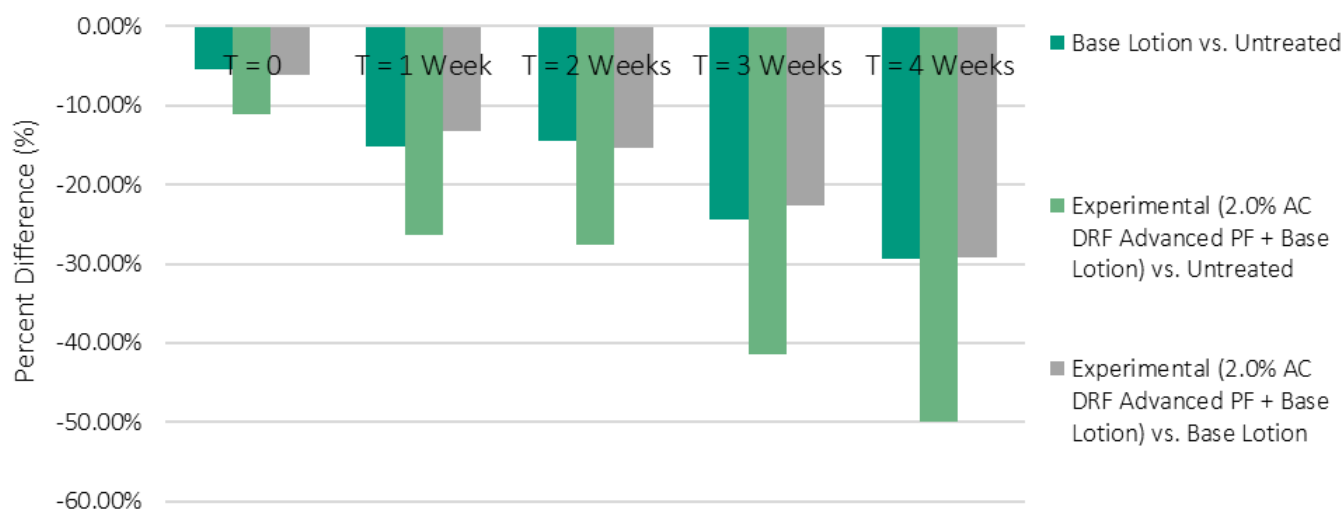
**Table 2.** Comparative Transepidermal Water Loss Results Between Individual Test Sites

## Transepidermal Water Loss Average Moisture Loss



**Figure 1.** TEWL measurements taken at individual test sites

## Transepidermal Water Loss Water Loss Comparison of Test Sites



**Figure 2.** Comparison of percent reduction in water loss over time between two test sites

## Discussion

As evidenced in a four-week efficacy study of **AC Dermal Respiratory Factor Advanced PF** on the skin, it can be used to effectively reduce transepidermal water loss with better results over time. When compared to the base cream **AC Dermal Respiratory Factor Advanced PF** was shown to decrease transepidermal water loss by 29% and by 50% when compared to the untreated control after four weeks. Results indicate that **AC Dermal Respiratory Factor Advanced PF** is capable of reducing TEWL, which allows for moisture retention.

**AC Dermal Respiratory Factor Advanced PF** was designed to provide moisture retention benefits, however with the present study we can confirm that this unique ingredient is not only capable of providing functional benefits but it is also capable of providing a decrease in transepidermal water loss therefore promoting moisture retention benefits when added to cosmetic applications.