nuturn CORPORATION

Internal Memorandum

E. R. KOSS
TECHNICAL SERVICES
JUN 10 1982
NUTURN CORP.

TO: E. R. Koss

DATE: June 8, 1982

c.c.: C. J. Sinclair
D. J. Fiete
M. T. McDonough

FROM: R. L. Armer

RE: Sears Semi-Met Approval

Attached are copies of letters from Steffan to Andelbrat and Andelbrat to myself summarizing Sears position on Semi-Met approval, or rather, lack of approval.

Ed, I'm planning a private meeting with Andelbrat on 6/15 and propose to get temporary release for 3401N8 by agreeing to conduct a reasonable amount of future testing based on Steffans requests. Please review and let me know what degree of testing we can accomplish over a given period of time. The complete approval by Sears is an absolute necessity and we need to get it done quickly and professionally.

R. L. Armer

RLA/sfa

PLAINTIFF'S EXHIBIT
MAR-400

SEARS, ROEBUCK AND CO.

NATIONAL HEADQUARTERS

June 1, 1982

Mr. Russ Armer
NUTURN CORPORATION
Airport Lane
Smithville, TN 37166

Dear Russ:

Attached is Gene Steffan's summary of his current position on Nuturn's semi-met formula. As we talked at the cost meeting, we wanted Gene to capsulize these points for you to bring to the attention of everyone concerned at Nuturn.

After you have had a chance to digest this letter, let us discuss how Gene's questions and concerns could be answered.

Very truly yours,

SEARS, ROEBUCK AND CO.

F. F. Andelbrat
Buyer
Department 628

FFA/dlm

Att:

cc G. Steffan, D/817
C. Burkhead, Maremont Corp.
C. Hunter, Maremont Corp.
M. McDonough, Nuturn Corp.

MAY 28 1982

May 26, 1982

F. Andelbrat
Department 628

Re: Nuturn 3401 N8 Semi-Metallic Friction Material

After reviewing the latest test data as contained in Nuturn's letter dated May 12, 1982 along with previously submitted data, the 3401 N8 friction material appears adequate for use as disc brake pads. The test data shows that the performance characteristics of fade, recovery, effectiveness, pad wear, rotor wear, noise and structural integrity are within satisfactory limits.

Alternately, the test data provided D/817 for review is inadequate to establish the superiority or inferiority of the 3401 N8 material compared to other semi-metallics or organic formulations, specifically with respect to disc pad and rotor wear. Factors preventing the formulation of conclusions comparing the performance levels of the different materials include:

(1) . The disc pads have not been tested on a vehicle, for pad or rotor wear, where the vehicle was designed for or originally equipped with semi-metallics.

(2) . Brake temperatures during dynamometer testing have been maintained well below; (1) the levels where semi-metallics are claimed to outperform organics and (2) reported temperatures (500F plus) for downsized vehicles during moderate to heavy brake useage.

WEAR CASE

(3) . The relative relationship between test results of the SAE J843 road tests and the ~~SAE J212~~ (Ford durability schedule) dynamometer tests are not in agreement.

(4) . Actual in-use fleet testing consists of only three (3) telephone company vans/trucks and two (2) personal passenger vehicles averaging only 4511 miles each.

BUILD DEARBORN MILEAGE

(5) . Life projections from fleet tests are unrealistically high.

While the basic question of product suitability has been satisfactorily verified by Nuturn tests, further testing is required to resolve the question of relative performance levels with respect to other friction materials. To evaluate this aspect of brake performance the following test programs are recommended.

- Conduct fleet tests with a statistically significant number of vehicles, in an urban environment, and on vehicles originally equipped with semi-mets (preferrably GM x-bodies). Friction materials employed should include at least the 3401N, 3401 N8 and MC-28 formulations.

- Conduct comparative tests employing Nuturn's dynamometer. Tests should be conducted with higher brake temperatures (determined by actual field measurement) and a Citation brake assembly.

- Compare brake designs of the Citation and Escort using the analysis technique presented in Nuturn's paper, "The State of the Art" dated March 16, 1982 by F. C. Skelton and verify with actual test data.

- Review with D/817 the specifics of the test programs before proceeding with actual tests.

E. M. Steffan
Department 817AO

EMS/fw