STATE OF MISSOURI
Mel Carnahan, Governor • Stephen M. Mahfood, Director
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL QUALITY
P.O. Box 176 Jefferson City, MO 65102-0176

FEB -5 1999

Charles Gilreath
Thermoid/HBD Industries, Inc.
240 Industrial Lane
P.O. Box 4310
Oenida, TN 37841-4310

RE: Thermoid Superlite QS, S, QV and V Hoses
**APPROVAL 99-02**

Dear Mr. Gilreath:

This is to inform you of the approval of the Balance Stage II Vapor Recovery hoses which your company submitted for MOPETP testing for Missouri approval. These hoses are the Superlite QS, S (whip hoses) and QV, V (venturi hoses), series. Six Thermoid Superlite QV 8 foot hoses and six Superlite V 8 foot hose were tested at the site. Both the Superlite QV hoses and Superlite V hoses have venturi devices for the removal of gasoline from the hose vapor line. The Superlite QS and the Superlite S are both whip hoses and are approved for this purpose only.

The MOPETP testing took place at the Amoco station at 1 South Lindbergh Blvd. In St. Louis County, June 23 - 25, 1998. Twelve dispensers and twelve hoses, and twelve whip hoses, were tested at the site.

Hose and system wide back pressures are crucial to system performance and demonstrating compliance. Care should always be taken, by those planning a station's vapor recovery system, to assemble components with compliant back pressures. It should be noted that the Superlite QV demonstrated lower back pressures during this testing than did the Superlite V. This should be considered along with the back pressure of all other components when setting up a system. System wide back pressures were within the acceptable limits.

The back pressure was determined for each hose by determining the back pressure of the nozzle and nozzle through hose. The average back pressures for the Thermoid Superlite QV hoses are presented in Table 3. The full system back pressures for these hose points are presented in Table 4. The average back pressures for the Thermoid Superlite V hoses are presented in Table 5. The full system back pressures for these hose points are presented in Table 6.

There appears to be a significantly higher back pressure (over a factor of 2) for the average hose back pressures between the two models. There is less difference between the system back pressure data.

The Missouri Department of Natural Resources' Air Pollution Control Program approves the equipment listed below, subject to the terms and conditions of this document and approval listed on **MOPETP Approval APCP-0001-001-98**. The equipment below is approved for use on all Approved Balance Vapor Recovery systems.

Table 3. Average Hose Back Pressure Data for the Thermoid 8' Superlite QV Hoses

| | **Hose Back Pressure ("WC) – Thermoid Superlite QV 8'** (8 Data Points) | | |
|---|---|---|---|
| | **40 cfh** | **60 cfh** | **80 cfh** |
| Average | 0.033 | 0.064 | 0.094 |
| Std. Dev | 0.010 | 0.011 | 0.016 |

Table 4. Average System Back Pressure Data for the Thermoid 8' Superlite QV Hoses

| | **System Back Pressure ("WC) – Thermoid Superlite QV 8'** (8 Data Points) | | |
|---|---|---|---|
| | **40 cfh (≤0.16 "WC)** | **60 cfh (≤0.35 "WC)** | **80 cfh (≤0.62 "WC)** |
| Average | 0.111 | 0.236 | 0.378 |
| Std. Dev | 0.030 | 0.030 | 0.042 |

Table 5. Average Dispenser Back Pressure Data for the Thermoid 8' Superlite V Hoses

| | **Hose Back Pressure ("WC) – Thermoid Superlite V 8'** (8 Data Points) | | |
|---|---|---|---|
| | **40 cfh** | **60 cfh** | **80 cfh** |
| Average | 0.071 | 0.129 | 0.205 |
| Std. Dev | 0.004 | 0.006 | 0.011 |

Table 6. Average System Back Pressure Data for the Thermoid 8' Superlite V Hoses

| | **System Back Pressure ("WC) – Thermoid Superlite V 8'** (8 Data Points) | | |
|---|---|---|---|
| | **40 cfh (≤0.16 "WC)** | **60 cfh (≤0.35 "WC)** | **80 cfh (≤0.62 "WC)** |
| Average | 0.122 | 0.249 | 0.402 |
| Std. Dev | 0.020 | 0.021 | 0.029 |

Six Thermoid Superlite QV 8 foot hoses and six Superlite V 8 foot hose were tested at the site. Both the Superlite QV hoses and Superlite V hoses have venturi devices for the removal of gasoline from the hose vapor line. The Superlite QV hose has a 5/8" ID inner hose constructed from black synthetic nitrile rubber. The outer hose is 1-21/64 " ID

vapor recovery hose constructed of a polyurethane material with a helical wire reinforcement. The Superlite V hose also has a 5/8" ID inner hose constructed from black synthetic nitrile rubber. However, the outer hose is made of corrugated polyester elastomer.

The back pressure was determined for each whip hose by determining the back pressure of the nozzle through hose and nozzle through whip hose. The average back pressures for the Thermoid Superlite QS whip hoses are presented in Table 7. The average back pressures for the Thermoid Superlite S hoses are presented in Table 8.

Table 7. Average Hose Back Pressure Data for the Thermoid 12" Superlite QS Whip Hoses

| | **Hose Back Pressure ("WC) – Thermoid Superlite 12" QS Whip Hose** (6 Data Points) | | |
|---|---|---|---|
| | **40 cfh** | **60 cfh** | **80 cfh** |
| Average | 0.010 | 0.018 | 0.032 |
| Std. Dev | 0.006 | 0.004 | 0.008 |

Table 8. Average System Back Pressure Data for the Thermoid 12" Superlite S Whip Hoses

| | **System Back Pressure ("WC) – Thermoid Superlite 12" S Whip Hose** (6 Data Points) | | |
|---|---|---|---|
| | **40 cfh (≤0.16 "WC)** | **60 cfh (≤0.35 "WC)** | **80 cfh (≤0.62 "WC)** |
| Average | 0.015 | 0.018 | 0.030 |
| Std. Dev | 0.005 | 0.008 | 0.009 |

Attached please find **MOPETP Approval APCP-0001-001-98**. MDNR, APCP thanks you for your cooperation and diligence .

Sincerely,

AIR POLLUTION CONTROL PROGRAM

Roger D. Randolph
Director,

RDR:bpt

Enclosure