

State of California
AIR RESOURCES BOARD

EXECUTIVE ORDER D-77
Relating to Exemptions under Section 27156
of the Vehicle Code

ALMQUIST MANUFACTURING LTD.
"RAM JET MINI-CHARGER"

Pursuant to the authority vested in the Air Resources Board by Section 27156 of the Vehicle Code; and

Pursuant to the authority vested in the undersigned by Section 39515 of the Health and Safety Code and Executive Order G-30A;

IT IS ORDERED AND RESOLVED: That the installation of the "Ram Jet Mini-Charger" device manufactured and marketed by Almquist Manufacturing Ltd. of Milford, PA 18337 has been found to not reduce the effectiveness of required motor vehicle pollution control devices and, therefore, is exempt from the prohibitions of Section 27156 of the Vehicle Code for 1977 and older model-year motor vehicles equipped with positive crankcase ventilation (PCV) systems except for the following:

- a) engines smaller than 140 cubic inch displacement
- b) Volkswagen vehicles
- c) fuel injection gasoline powered vehicles
- d) diesel or supercharged vehicles
- e) Chrysler Electronic Lean Burn System
- f) Volvo 3-way catalyst
- g) Variable Venturi Carburetor Systems

This device consists of an adjustable modulating valve which permits filtered air (80PP1 polyurethane filter) to enter the intake manifold through the positive crankcase ventilation (PCV) line between the PCV valve and the engine. The device can be identified by a label on the devices with the name "Ram Jet Mini-Charger" permanently imprinted on it.

This Executive Order is valid provided that installation instructions for this device will not recommend tuning the vehicle to specifications different from those listed by the vehicle manufacturer.

Changes made to the design or operating conditions of the device, as exempted by the Air Resources Board, that adversely affect the performance of a vehicle's pollution control system shall invalidate this Executive Order.

Marketing of this device using an identification other than that shown in this Executive Order or marketing of this device for an application other than those listed in this Executive Order shall be prohibited unless prior approval is obtained from the Air Resources Board.

This Executive Order does not constitute any opinion as to the effect that the use of this device may have on any warranty either expressed or implied by the vehicle manufacturer.

THIS EXECUTIVE ORDER DOES NOT CONSTITUTE A CERTIFICATION, ACCREDITATION, APPROVAL, OR ANY OTHER TYPE OF ENDORSEMENT BY THE AIR RESOURCES BOARD OF ANY CLAIMS OF THE APPLICANT CONCERNING ANTI-POLLUTION BENEFITS OR ANY ALLEGED BENEFITS OF THE "RAM JET MINI-CHARGER".

No claim of any kind, such as "Approved by Air Resources Board" may be made with respect to the action taken herein in any advertising or other oral or written communication.

Section 17500 of the Business and Professions Code makes untrue or misleading advertising unlawful, and Section 17534 makes violation punishable as a misdemeanor.

Section 43644 of the Health and Safety Code provides as follows:

"43644. (a) No person shall install, sell, offer for sale, or advertise, or, except in an application to the state board for certification of a device, represent, any device as a motor vehicle pollution control device for use on any used motor vehicle unless that device has been certified by the state board. No person shall sell, offer for sale, advertise, or represent any motor vehicle pollution control device as a certified device which, in fact, is not a certified device. Any violation of this subdivision is a misdemeanor."

Any apparent violation of the conditions of this Executive Order will be submitted to the Attorney General of California for such action as he deems advisable.

Executed at Sacramento, California, this 20th day of October, 1977.


Thomas C. Austin
Deputy Executive Officer

State of California

AIR RESOURCES BOARD

September 30, 1977

Staff Report

Evaluation of Almquist Manufacturing, Ltd.
"Ram Jet Mini-Charger" device
for Compliance with the Requirements of
Section 27156 of the Vehicle Code

I. Introduction

Almquist Manufacturing Ltd., Milford, PA 18337 has submitted an application (see Appendix A) requesting an exemption from Section 27156 of the California Vehicle Code for its "Ram Jet Mini-Charger" device for installation on all 1977 and older model vehicles equipped with positive crankcase ventilation systems (PCV) except for the following:

- a) engines smaller than 140 cubic inch displacement
- b) Volkswagen vehicles
- c) fuel injection gasoline powered vehicles
- d) diesel or supercharged vehicles

Section 27156 of the Vehicle Code prohibits the installation, sale or advertisement of any device or mechanism which alters the performance or design of the vehicle's emission control systems. The Air Resources Board is empowered to exempt any device from this prohibition if a finding shows the device will not reduce the effectiveness of the emission control system.

September 30, 1977

II. System Description and Function

The "Ram Jet Mini-Charger" is an air bleed device installed in the hose between the PCV valve and intake manifold. (See Appendix A Page 3.) The device consists of an acetal copolymer cylindrical ribbed body with barbed inlet and outlet fittings, (that can be installed in either direction) a stainless steel spring, a nylon ball valve, a polyurethane filter, a stainless steel screen, and an acetal copolymer adjustable knob.

The device permits filtered air to enter the PCV line. The amount of air is dependent on a combination of manifold vacuum and an adjustable knob setting which acts on the spring and ball valve which in turn limits the flow of intake air.

The applicant has submitted a letter dated September 26, 1977 (Appendix B) stating that he will supply an 80 pores per inch (PPI) polyurethane filter with each device. Although the pore size is larger (0.012 inches) than the ARB criterion of 20 microns (.0008 inches), the staff is of the opinion that this pore size is in conformity with previously exempted air filters.

September 30, 1977

III. System Evaluation

The applicant did not supply any information concerning the air flow at various adjustment levels. Previous exempt devices of a similar nature were non-adjustable. The staff therefore performed its own flow tests.

The adjustable knob was first fully tightened and the device installed according to the diagram in Figure 1. Vacuum was varied from 18 inches of mercury down to 3 inches and back up to 18 inches. The knob was turned counterclockwise in one quarter turn increments up to 2 1/2 revolutions. The corresponding air flow was measured in cubic feet per hour with the greatest flow occurring when the knob was a quarter of a turn from the fully closed position. When decreasing vacuum from 18 in. Hg. to 3 in. Hg. the air flow ranged from 0.28 SCFM to 0.17 SCFM. With increasing vacuum, the air flow ranged from 0.53 SCFM at 3 in. Hg., to a maximum 1.2 SCFM at 7 inches Hg. and decreased rapidly to 0.17 SCFM between 7 to 8 inches of Mercury. Between 8 thru 18 inches of Hg. it remained constant at 0.17 SCFM (Figures 2 and 3).

The ARB criteria is 0.5 SCFM (maximum) at greater than 7 inches of Hg. for engines greater than 140 cubic inches. The device met this criteria except for the range between 7 in. of Hg. and 8 in. of Hg. The staff is of the opinion that the effect of this narrow range on emissions would not be significant (Figure 2).

September 30, 1977

The applicant submitted 30 MPH and 50 MPH steady state emission data, dated January 2, 1974, which were performed by the Scott Research Laboratories, Inc. (see Appendix C). The official test procedure is the CVS test cycle and therefore the staff did not consider this data significant since it did not show emissions during acceleration or deceleration or at low speeds.

IV. Manufacturer's Claims

The manufacturer made the following advertising claims (Appendix A):

- a) "Guaranteed increased gasoline mileage--greatest fuel savings have been experienced in older and high mileage vehicles operating under low manifold vacuum/high load operating conditions."
- b) "Guaranteed smooth engine performance especially in older and high mileage vehicles or with engines that have over-rich fuel mixtures."

The ARB staff believes that the device will not give significant benefits in fuel economy. Past experience has shown that for a typical engine in normal operating condition this amount of air will have an insignificant effect on the air-fuel ratio and therefore no significant effect on fuel economy or emissions. For an older engine with rich carburetion there may be some small leaning effect at low speeds and loads.

Evaluation of Almquist Manufacturing, Ltd.
"Ram Jet Mini-Charger" device for Compliance
with the Requirements of Section 27156 of
the Vehicle Code

September 30, 1977

V. Conclusion and Recommendations

Based on the ARB test data and the information submitted by the applicant, the staff concludes that the installation of this device in the specified vehicles will not result in increased emissions and recommends that Almquist Manufacturing Ltd. be granted an exemption for the "Ram Jet Mini-Charger" from the prohibitions of Vehicle Code Section 27156 for the 1977 and older model vehicles except those listed in Section I of this report and the following:

- e) Chrysler Electronic Lean Burn System
- f) Volvo 3-way catalyst
- g) Variable Venturi Carburetor Systems

The staff therefore recommends adoption of Executive Order D-77.



Almquist Manufacturing Ltd.

MILFORD, PA. 18337

ENGINEERING OFFICE
PHONE 717 296-7416

July 18, 1977

Mr. G. C. Haas, Chief
Vehicle Emissions Control Division
Air Resources Board
9528 Telstar Avenue
El Monte, California 91731

Dear Mr. Haas:

We wish to apply for exemption from the prohibitions of California Vehicle Code Section 27156 for our "MINI-CHARGER" PCV HOSE DEVICE.

Enclosed herewith are:

- A) Working sample of device.
- B) Description of operating principle.
- C) Independent laboratory report of device as tested in prototype form.
- D) Installation instructions.
- E) Vehicle application and engine limitation list.
- F) Statement of advertising claims and performance guarantee.

It is also our intention to market this device along with a low cost dash-mounted vacuum gauge. If for some reason, you take exception to this use kindly delete this feature from our application.

We would appreciate your prompt review of this multiple use device. If for some reason, you do not feel that an exemption is justified kindly specify the reason and we will immediately make any changes necessary to comply.

Respectfully,

Ed Almquist
RECEIVED

NOTE: If you or any member of your staff have any questions, kindly telephone me at the above number anytime.

EA/jr

MINI-CHARGER
"Ramjet Series"

WHAT IT IS:

The MINI-CHARGER is a patented (no. 3,118,435 and patent pending) device designed to function both as an intake manifold air bleed valve and liquid emissions vaporizer. The device will also function as a "T" fitting for use with a vacuum gauge as described below.*

*OPTIONAL FEATURE The clean-out knob may be removed at anytime and replaced with a special screw-in CONNECTOR for installation of a vacuum gauge or closed vacuum switch for use with a dash-mounted, economy driving, indicator light.

VEHICLE APPLICATION AND ENGINE LIMITATIONS

Two models fit all popular 1977 and older American and imported cars and light trucks equipped with PCV systems. Exceptions are engines smaller than 140 CID, Volkswagons, fuel injection, diesel or supercharged vehicles.

HOW THE MINI-CHARGER WORKS:

The MINI-CHARGER is designed to function automatically in the following two ways:

1. The spring-loaded ball valve opens whenever engine vacuum drops (below 4"Hg) which is when the carburetor's power circuit cuts in and the fuel-air mix becomes richer than necessary for optimum power and fuel economy. (Such "over-rich" carburetion commonly occurs when the vehicle is under hard acceleration, climbing hills, pulling heavy loads or when driven "hard" at high speeds or when "over-accelerating" which is a frequent driving error.) Our tests indicate that the MINI-CHARGER has the capability of improving air-fuel ratios when the engine is operating under high load conditions without over-leaning or degrading performance.
2. The MINI-CHARGER's "smog trap" collects wet blow-by condensates containing heavy hydrocarbons for later aerating and vaporizing by lighter blow-by gases that pass through the internal baffling system. This feature is especially important during and prior to engine warm-up because this is when the blow-by contains the most water vapor and heavy oil and fuel particles which otherwise interfere with complete combustion and may cause increased engine deposits and wear.

AIMQUIST MANUFACTURING LTD.
Milford, Pa. 18337

PERFORMANCE CLAIMS

+ GUARANTEED INCREASED GASOLINE MILEAGE* (Greatest fuel savings have been experienced in older and high mileage vehicles operating under low manifold vacuum/high load operating conditions.)

+ GUARANTEED SMOOTH ENGINE PERFORMANCE* especially in older and high mileage vehicles or with engines that have over-rich fuel mixtures.

+ TOUGH SPACE AGE PLASTIC is guaranteed to last the lifetime of the car.

+ "TUNING" KNOB provides for quick attachment of vacuum gauge by mechanic for easy checking of valve action of device in addition to detection of leaks or clogging of PCV line and other tune-up and diagnostic purposes. Removable knob also provides for quick and easy cleaning of the valve without removal of device from the line.

+ ECONOMY DRIVING GAUGE HOOK-UP OPTION. Knob can be replaced with threaded barb (available from factory) for quick and easy attachment of vacuum gauge or to a closed vacuum switch for use with a permanently dash-mounted driving light which will function as a driving indicator. (A vacuum gauge is recognized as one of the best means of accomplishing economical driving habits.)

*NOTE: All performance claims are based on actual user reports (which may be MORE or LESS depending on vehicle make, mileage, age, condition, optional equipment and when, where and how the vehicle is driven.)

DOUBLE GUARANTEE

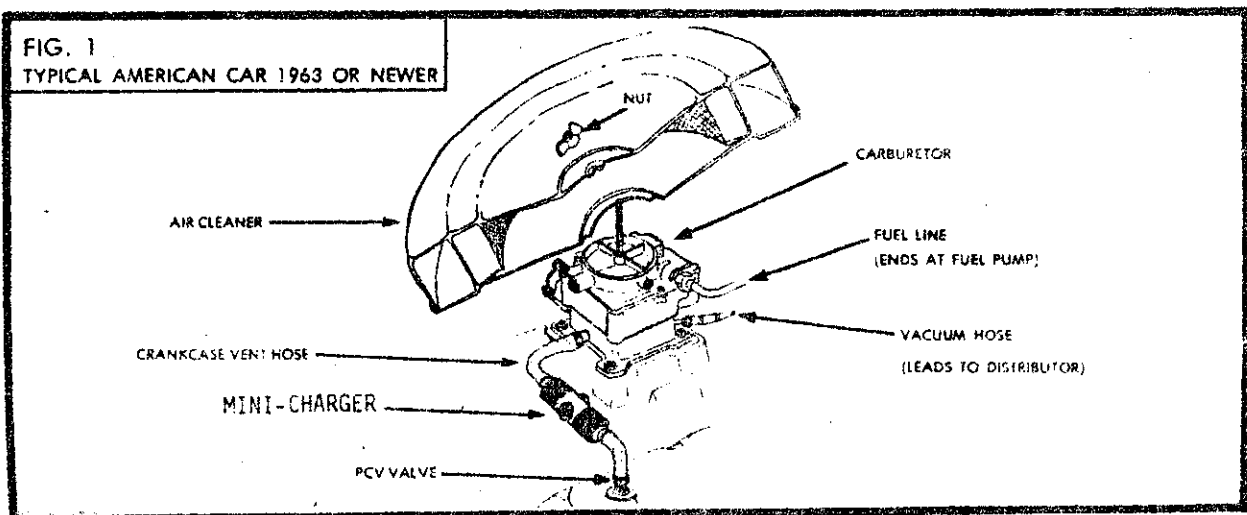
The MINI-CHARGER is guaranteed to improve mileage and performance as advertised or purchase price will be refunded by dealer anytime during the first year after purchase. The MINI-CHARGER is further guaranteed by the factory against defect in material or workmanship for as long as purchaser owns vehicle or replacement will be made free of charge.

INSTALLATION INSTRUCTIONS

The MINI-CHARGER can be installed easily in just minutes directly in the PCV vent line in most cars and light trucks (1963 to present)*. Here's how:

1. After engine is warmed to normal operating temperature, shut off engine and lift hood. Remove air cleaner if necessary.
2. Locate the large PCV vent line (which is usually a rubber hose about the diameter of your finger) that leads from the PCV valve to a point of entry near the carburetor base. Cut PCV vent hose with a sharp knife as close to carburetor as possible---allowing room so MINI-CHARGER will not touch any moving or hot parts.
3. Insert and clamp MINI-CHARGER nipples snuggly into cut ends of PCV HOSE. If hose appears old or hard or partially clogged, replace it. The MINI-CHARGER may be installed in any angle or direction

*NOTE: Some engines require a special adaptor kit which includes a short length of PCV vent hose which is supplied free of additional charge.



ADJUSTMENT

The MINI-CHARGER is factory adjusted to fit all popular cars in good mechanical condition. However, valve action should always be checked immediately after installation or cleaning, to be sure valve closes when the engine is idling.

CHECK VALVE ACTION with engine idling by placing finger over end of air inlet. A "popping" sound should be heard when finger is removed.

If a steady "swishing" or "hissing" sound of air is heard at idle, turn knob counter-clockwise until air hiss sound stops--indicating that the valve is closed. Remember, the air valve must always CLOSE at idle.

SERVICING:

Remove filter ring and clean filter element in suitable solvent every 5,000 miles (sooner if vehicle is driven in dusty areas). Also check PCV line and clean or replace PCV valve at regular intervals as recommended in your car owners manual.

The MINI-CHARGER valve may be cleaned without removing the device from the line by simply screwing out the knob and pouring in a small amount (equivalent to a tablespoon) of any good carburetor cleaner to flush out the valving mechanism. Use a wipe cloth to catch excess solvent that flushes out the MINI-CHARGER's air intake as you rotate it. Do this only when the engine is shut OFF.

* * * *

THE MINI-CHARGER IS MANUFACTURED BY ALMQUIST MFG. COMPANY,
MILFORD, PA. 18337

PRICE:

Average retail price of the MINI-CHARGER is \$9.95 installed. This includes inspection and cleaning of the PCV valve and blowing out the PCV vent hose. Extra lengths of approved PCV hose are included in all dealer shipments so that replacement can be made of part or all of the present PCV line since we find that approximately 50% of all PCV hoses are partially clogged or deteriorated beyond further use.

NOTE:

Labels will have product name, patent number and patent pending.

Aluminum snap ring will be changed to plastic with short "ears" for easy grasping and removal of filter element.

Extra filter elements will be supplied with each unit.

SRL 1415 01 0174

Technical Report

On

Exhaust Emissions And
Fuel Economy Tests
(January 2, 1974)

Prepared For:

Sammy Fields Enterprizes, Inc.
250 West 25th Street
Suite 1924
New York, New York 10019

The devise referred to in this report as "Fuel-Tool" is now called "MINI-CHARGER" and features several internal improvements over the original. Less air bleed occurs at a lower vacuum range and adjustment is fixed in the newer model. Patents and patents pending are owned by E. Almquist.

SCOTT RESEARCH LABORATORIES, INC.
Plumsteadville, Pennsylvania 18949

1.0 INTRODUCTION

Scott Research Laboratories, Inc. performed a series of steady state emission and economy tests on a vehicle provided by the sponsor on January 2, 1974. The objective of the tests was to determine the effect of the sponsor's two prototype devices on the exhaust emitted and fuel consumed by the test vehicle. Described below are the test vehicle, devices, procedures, and results obtained.

2.0 DESCRIPTION OF TEST VEHICLE

All tests were performed using the sponsor's 1971 Monte Carlo (VIN 138750B175149) which had an automatic transmission, a 2 bbl carburetor, and an eight cylinder 350 CID engine. Following each test idle speed was 580 rpm in drive, dwell was 28.5, and timing was 7° BTDC. All tests were performed using Indolene #30 gasoline. The odometer registered 73,568 miles at the start of testing.

3.0 DESCRIPTION OF DEVICES

Scott performed tests using two different prototype devices referred to by the sponsor as "Fuel Tool" devices. Device A was constructed of clear plastic and had an inlet air adjustment. Device B was black plastic and had no inlet air adjustment. Either device could be installed in the hose between the vehicle's PCV valve and carburetor. Each device allowed varying amounts of air (dependant on vacuum) to be bled into the vehicle's carburetor through the PCV line.

4.0 DESCRIPTION OF TESTS AND TEST PROCEDURES

Upon receipt of the test vehicle Scott measured idle speed, timing, and dwell to insure compliance with manufacturer's specifications. A side tank of Indolene #30 gasoline was installed and the vehicle was warmed-up by operating it on a dynamometer at 50 mph and road load (4000 pounds inertia). Emission and fuel economy tests were then performed with and without the sponsor's device installed while operating the vehicle at 50 and 30 mph. Two tests were performed at an increased load setting (18.4 rhp at 50 mph) at the sponsor's request. All other tests were performed at road load (12.0 rhp at 50 mph).



SRL 1415 01 0174

Each test consisted of measuring the emissions of unburned hydrocarbons, carbon monoxide, and carbon dioxide on a grams/mile basis. Fuel economy was then calculated on a miles per gallon basis using the emission data and the Environmental Protection Agency's carbon balance formula.

4.0 SUMMARY OF TEST RESULTS

Economy and emission data for each test is summarized in Table 1. Table 2 presents the calculations used to derive the Table 1 data.





TABLE 1 SUMMARY OF TEST RESULTS (3 JAN. 1974)

Veh: 1971 Monte Carlo

VIN: 138750B175149

Inertia: 4000#

Test	Speed (mph)	Load (rhp @ 50)	Device	MPG	Grams/Mile Emissions		
					HC	CO	CO ₂
1	50	18.4	Baseline	17.65	1.62	12.11	478.70
3	50	18.4	A-Set 1	18.42	0.98	3.17	473.71
			% Difference	4.4	NC	NC	NC
2	50	12.0	Baseline	21.79	1.34	17.71	375.23
4	50	12.0	A-Set 1	22.49	1.40	4.47	383.13
			% Difference	3.2	NC*	NC	NC
5	50	12.0	Baseline	22.11	1.32	16.59	371.24
6	50	12.0	A-Set 2	22.69	1.22	10.49	370.89
			% Difference	2.6	NC	NC	NC
7	30	12.0	A-Set 2	23.59	2.44	29.67	321.92
8	30	12.0	B	23.89	2.00	21.02	330.44
9	30	12.0	Baseline	22.96	2.21	30.32	331.98
			% Difference Base/A	2.7	NC	NC	NC
			% Difference Base/B	4.0	NC	NC	NC

*NC = Not Calculated



TABLE 2. CALCULATION SHEET
(1971 Monte Carlo) (3 Jan. 1974)

Test Number	1	2	3	4	5	6	7	8	9
Test Duration (min.)	4	4	4	4	4	4	4	4	4
Vehicle Speed (mph)	50	50	50	50	50	50	30	30	30
Device	Baseline	Baseline	Device A	Device A	Baseline	Device A**	Device A**	Device B	Baseline
Inertia (lbs.)	4000	4000	4000	4000	4000	4000	4000	4000	4000
RHP @ 50 mph	18.4	12.0	18.4	12.0	12.0	12.0	12.0	12.0	12.0
Manifold Vac*	12.0	12.9	11.0	11.5	12.9	12.5	13.5	13.2	13.2
Temp. (D)	-	-	-	-	-	-	-	-	-
gr. H ₂ O/lb Air	-	-	-	-	-	-	-	-	-
K _H	-	-	-	-	-	-	-	-	-
Bar Press. (mmHg)	762.34	762.34	762.34	762.34	762.34	762.34	762.34	762.34	762.34
CVS Press. (mmHg)	-13.28	-13.28	-13.28	-13.28	-13.28	-13.28	-13.28	-13.28	-13.28
(P) Sample Press. (mmHg)	749.06	749.06	749.06	749.06	749.06	749.06	749.06	749.06	749.06
(V) Pump Disp. (CFR)	.3232	.3232	.3232	.3232	.3232	.3232	.3232	.3232	.3232
(N) Pump Revs.	4325	4325	4333	4327	4325	4321	4323	4327	4327
(X) Temp. (R°)	579.7	579.7	579.7	579.7	579.7	579.7	579.7	579.7	579.7
(M) Test Miles	3.33	3.33	3.33	3.33	3.33	3.33	2.0	2.0	2.0
PVN/TM	542.41	542.53	543.41	542.66	542.41	541.91	902.69	903.53	903.53
HC (ppm-C)	263.4	216.6	158.8	226.8	213.2	199.2	238.5	195.9	215.4
HC (g/mi) = $(\frac{PVN}{TM})(11.348)(HC)(10^{-6})$	1.62	1.34	0.98	1.40	1.32	1.22	2.44	2.00	2.21
CO (ppm)	975	1425	255	360	1335	845	1435	1020	1465
CO(g/mi) = $(\frac{PVN}{TM})(22.905)(CO)(10^{-6})$	12.11	17.71	3.17	4.47	16.59	10.49	29.67	21.11	30.32
CO ₂ (%)	2.45	1.92	2.42	1.96	1.90	1.90	0.99	1.02	1.02
CO ₂ (g/mi) = $(\frac{PVN}{TM})(36.022)(CO_2)(10^{-2})$	478.70	375.23	473.71	383.13	371.24	370.89	321.92	331.98	331.98
NO _x (ppm)	-	-	-	-	-	-	-	-	-
(NO _x)(K _H)	-	-	-	-	-	-	-	-	-
NO _x (g/mi) = $(\frac{PVN}{TM})(37.628)(NO_x)(10^{-6})$	-	-	-	-	-	-	-	-	-
(HC g/mi)(.866)	1.403	1.160	0.849	1.212	1.143	1.057	2.113	1.732	1.914
(CO g/mi)(.429)	5.195	7.598	1.360	1.918	7.117	4.500	12.728	9.056	13.007
(CO ₂ g/mi)(.273)	130.685	102.438	129.323	104.594	101.349	101.253	87.884	90.630	90.631
TOTAL	137.283	111.196	131.532	107.724	109.609	106.810	102.725	101.418	105.552
MPG $\frac{2423}{Total}$	17.65	21.79	18.42	22.49	22.11	22.69	23.59	23.89	22.96

* Read from Sponsor's VAC Gauge

** Setting Number 2



Almquist Manufacturing Ltd.

MILFORD, PA. 18337

ENGINEERING OFFICE
PHONE 717 296-7416

August 30, 1977

Air Resources Board Laboratory
K. D. Drachand, Chief Engineering Branch
9528 Telstar Ave.
El Monte, CA 91 31

Dear Sir:

We respectfully submit the enclosed information which should enable you to complete your evaluation of our "Ramjet Mini-Charger" PCV hose attached device.

If there is any further information that you require I would appreciate if you would call me collect in order to expediate this matter.

Sincerely,

Ed Almquist
Almquist Mfg. Ltd.

ENCLOSURES

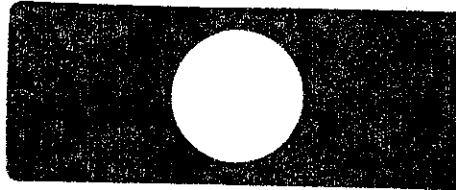
- (1) Additional Information
 - (2) Engineering Resins Booklet.
- EA/jjr

RECEIVED

MANUFACTURER: Almquist Mfg. Ltd. Date: August 26, 1977

ADDITIONAL INFORMATION FOR
"Ramjet Mini-Charger" PCV
Hose Attached Device

- (1) New label as shown



- (2) With adjustment set at maximum air flow (knob screwed clockwise IN), device permits no air flow at manifold vacuums higher than four (4) inches of mercury. At vacuums lower than four inches of mercury, the air flow is less than similar PCV connected air bleed devices (such as the Ball-Matic Air Injector and Albano Air Jet which have already received exemption from the air resources board).

When the engine is not operating, the ball closes against the upper valve seat to prevent crankcase vapor from escaping into the atmosphere. The ball valve also closes against its upper seat in the event of an engine back-fire.

- (3) The part number, name, specifications and material of all the working components are as follows:

Part# MS2 - 2A---Body: Acetal Copolymer (Celcon) virgin quality. Note that this material can withstand continuous use temperatures of 220°F with intermittent temperatures of between 220° to 300°F without sacrifice of properties.

Part# MS2 - 2B---End Pieces (2): (same material as above body).

Part# MS2 - 2C---Adjusting Knob: (same material as above body).

Part# MS2 - 2D---Ball Valve: 7/16" diameter plus and minus .010". NYLON (Dupont's Zytel 101 Composition). Maximum usable temperature is 360°F. Resistant to attack from oil, gasoline and the weak acids in crankcase blow-by.

Part# MS-E Spring: Stainless Steel.

Part# MS-F Screen: Stainless Steel .010" wire diameter X 40 X 40 mesh.

Part# MS2-G Filter Element: Porous polyurethane foam #45PPI.

- (4) We call your particular attention to pages 14 thru 21 in the enclosed book containing specifications of engineering resins. You will note that the material (Acetal Copolymer) that we use for body parts compares favorably and often surpasses nylon with respect to resistance to heat, stress, gasoline and oil. From this data you can see that our device will easily outlast the neophrene-buna vent hose to which it is attached.

Celenese Corporation engineers originally recommended the use of Celcon (Acetal Copolymer) for our specific automotive application. We based our lifetime of car guarantee on field experience of over two years that proved that the plastic parts will not deteriorate even after prolonged use. We also made numerous tests with prototypes made from Celcon. These test included the following:

- (A) Soaking for over 180 days in gasoline and old (dirty) crankcase oil solution which proved no apparent deterioration of materials.
- (B) Over 50 cycles of intermittently freezing and boiling the device (in water) to determine the effect on material and press fit of parts (all tests were positive).
- (C) Striking assembled device with heavy rubber mallet at freezing, 100, 150, 220°F temperatures (all tests were positive).
- (D) Actual working production models have satisfactorily operated for 55,000 to over 100,000 miles in six American made cars without deterioration of either the Acetal Copolymer or the Nylon.
- (E) Numerous 12 to 24 month "heat" tests were made with actual working production models placed flush against the intake manifolds and valve covers on Chevrolet, Ford and Plymouth automobiles. In no case was there any deterioration of material.

have my first beer and my eggs," he says. The tour bus also points out Billy's gas station where he used to sit with his beer and sold under the company name of Plain Peanut products that will be gift-wrapped permitting his famous face to appear on the U.S. Government Awards The Ram-Jet Supercharger Patent No. 3118439. And other patents pending.

About Our Cover — Upper left: (standing) police chief Billy McCune, Hugh Carter, his father, Alton, fire chief James Mortis, (sitting) Mrs. All Smith (Rosilyn's mother), Jono and Earle Carter. Lower right: One of the town's mini-buses. Courtesy photos by Ken Hawkins and Wayne Perkins.

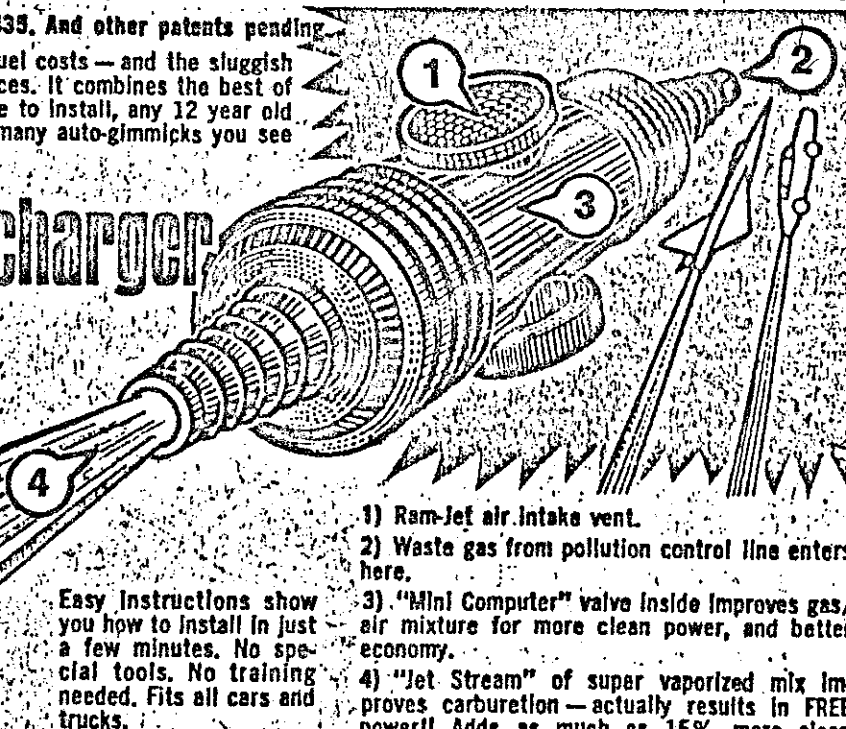
The Ram-Jet Supercharger is a great new weapon in America's war on high fuel costs — and the sluggish performance you get because of government mandated pollution control devices. It combines the best of automotive and aviation air induction principles. (Yet it's so brilliantly simple to install, any 12 year old can do it in a few minutes) ... So do not confuse the RAM-JET with all the many auto-gimmicks you see advertised that have no patent and serve no real purpose.

NOW! New Ram-Jet Supercharger TURNS POLLUTION INTO FREE POWER FOR YOUR CAR.

(Can give you up to 50 extra miles for every tankfull)*

New Ram-Jet Actually "Jet Assists" Your Car Engine... Makes It Burn Up To 15 Gallons Of Air For Every Gallon Of Gas... And Gives You As Much As 15% More Clean Power! Jet Like Acceleration!

We believe Ram-Jet is the most exciting piece of high performance automotive equipment since... NOW WITH GOVERNMENT INSISTENCE ON POLLUTION CONTROL DEVICES, THE WASTE IN POWER AND



- 1) Ram-Jet air intake vent.
- 2) Waste gas from pollution control line enters here.
- 3) "Mini Computer" valve inside improves gas/air mixture for more clean power, and better economy.
- 4) "Jet Stream" of super vaporized mix improves carburetion — actually results in FREE power! Adds as much as 15% more clean power (And it does so with absolute 100% safety).

The Ram-Jet is virtually indestructible — made of a fantastic DuPont space-age material. It never needs replacing. Is guaranteed for at least 100,000 miles.

the Ram-Jet automatically and safely jets air into the gas mixture the very split second your driving conditions require it.

2) It captures the polluted air that would ordinarily be fed back into your engine... and re-energizes it into a "Jet Stream" that is once again ignited into useful clean power instead of clogging up your engine and making it hesitate and stall and waste

YOU AS MUCH AS 15% MORE Clean Power! Jet Like Acceleration!

We believe Ram-Jet is the most exciting piece of high-performance automotive equipment since the V-8. Yet it weighs only a few ounces. Installs in a couple of minutes (No special tools or training needed. You won't even get your hands greasy). Costs less than a tankful of gas. And saves you so much gas, it's like getting up to one gallon in every ten FREE!

The brainchild of Ed Almquist, internationally famous automotive engineer, and the "Thomas Edison of high-performance accessories"... The Ram-Jet took over 20 years to develop and perfect. And now—only after proving itself beyond a shadow of a doubt—at Pocono and other stock car races, as well as in a national test of thousands of ordinary cars in normal driving situations... NOW, AT LAST, THE RAM-JET IS READY FOR YOU! READY TO TURN POLLUTION INTO FREE POWER!

How does it work?

Just as a jet engine requires a certain supply of air to operate... so does the gasoline combustion engine in your car. And it's the carburetor that mixes this air with fuel to fire the cylinders and make your car go. The problem is that carburetors were invented over 50 years ago when gas was plentiful and cheap and air pollution wasn't even talked about. The carburetor hasn't changed much since then. It's still a big compromise! It only works perfectly on those rare occasions when all driving conditions are perfect. (Which averages only a couple of minutes at the most out every driving hour). Your carburetor just can not efficiently adjust itself to your stop-and-go driving, sudden bursts of speed, or to put it in technical terms... those many occasions when your engine is operating under 0-10" high-load conditions. When this crucial mixture of air and gas is not right on the money, the result is a loss of power with a lot more gas being burned than is really necessary!

JOIN THIS NATIONWIDE ENERGY-SAVING RESEARCH PROGRAM. Do your part to help America beat the energy crisis... simply by sending us a brief report of the kind of gas savings and increased power you enjoy once you add the RAM-JET Supercharger to your car. Many thousands of participants are needed for this most worthwhile research. The results of which will be tabulated and released to the engineering departments of major American universities, automotive companies, the U.S. Government and the general public.

*All performance claims are based on actual user reports (which may not be typical). Your results may be more or less, depending on vehicle make, age, condition, optional equipment; and when, where and how the vehicle is driven.

Turn Your Car Into A Money-Making-Machine. Enquire About Unique Ram-Jet Agent Program.

NOW WITH GOVERNMENT INSISTENCE ON POLLUTION CONTROL DEVICES, THE WASTE IN POWER AND GASOLINE IS EVEN GREATER THAN EVER. BECAUSE THE BLOW-BY POLLUTION THAT USED TO BE RELEASED INTO THE AIR IS NOW FED BACK INTO YOUR ENGINE.

If you've ever wondered why the newer cars seem to have even less power than the older ones, well now you know. Today, you can pay as much as \$10,000 or \$20,000 (or even more) for a new car and still find it lacks real oomph when you need it, hesitating and even stalling out on you frequently.

Now, at last, the Ram-Jet to the rescue!

It solves both problems at once.

It brings your 50-year-old carburetor design into the Jet Age.

1) It works like a "mini-computer" to automatically adjust the air/gas mixture to your every driving need. It thus steps up gas molecularization... reducing the over-rich mixture before it becomes wasteful. Just as a jet engine sucks air into it...

WHAT DO PEOPLE SAY ABOUT THE RAM-JET SUPERCHARGER? WE GET LETTERS LIKE THESE EVERY DAY.

An airline pilot writes:

"Suddenly my little six cylinder engine seems to have the power of an eight. Yet it saves gas like it was a four. That little Ram-Jet is amazing!" — Phillip Shade,

Plymouth, Connecticut

"I have a Ram-Jet. And so do many of my parishioners. We found out that we average from 2 to 6 more miles per gallon with much more engine pep and acceleration."

The Rev. P. Mick Harvey, Illinois

MAIL THIS NO-RISK COUPON TODAY!

ALMQUIST MANUFACTURING, LTD. Dept. RS-2981
521 Fifth Avenue, Suite #803 — New York, N.Y. 10017

Canadian residents write:
4221 St. Catherine Street West
Suite 220, Montreal, Quebec H 3Z 2T6

Please rush me the miraculous patented RAM-JET Supercharger that turns pollution into FREE Power! And as a free gift I will also receive the DOUBLE YOUR GAS MILEAGE report and Miles-Per-Gallon calculator to prove how much gas I save.

I understand that anytime during the next 100,000 miles I may return the RAM-JET for a full money-back refund. No questions asked. (And I may keep the report and the calculator as free gifts).

On that basis, here is \$12.95 (plus .75¢ for postage & handling). Order two for just \$21.95 (complete). You save \$5.45.

Enclosed is cash, check or money order. Or, you may charge my:

☐ MASTERCHARGE ☐ BANKAMERICARD

Acct. # _____

INTER BANK # _____

Expiration date of card _____

Truck or Car (year & model): _____

NAME: _____

ADDRESS: _____

CITY: _____ STATE: _____ ZIP: _____

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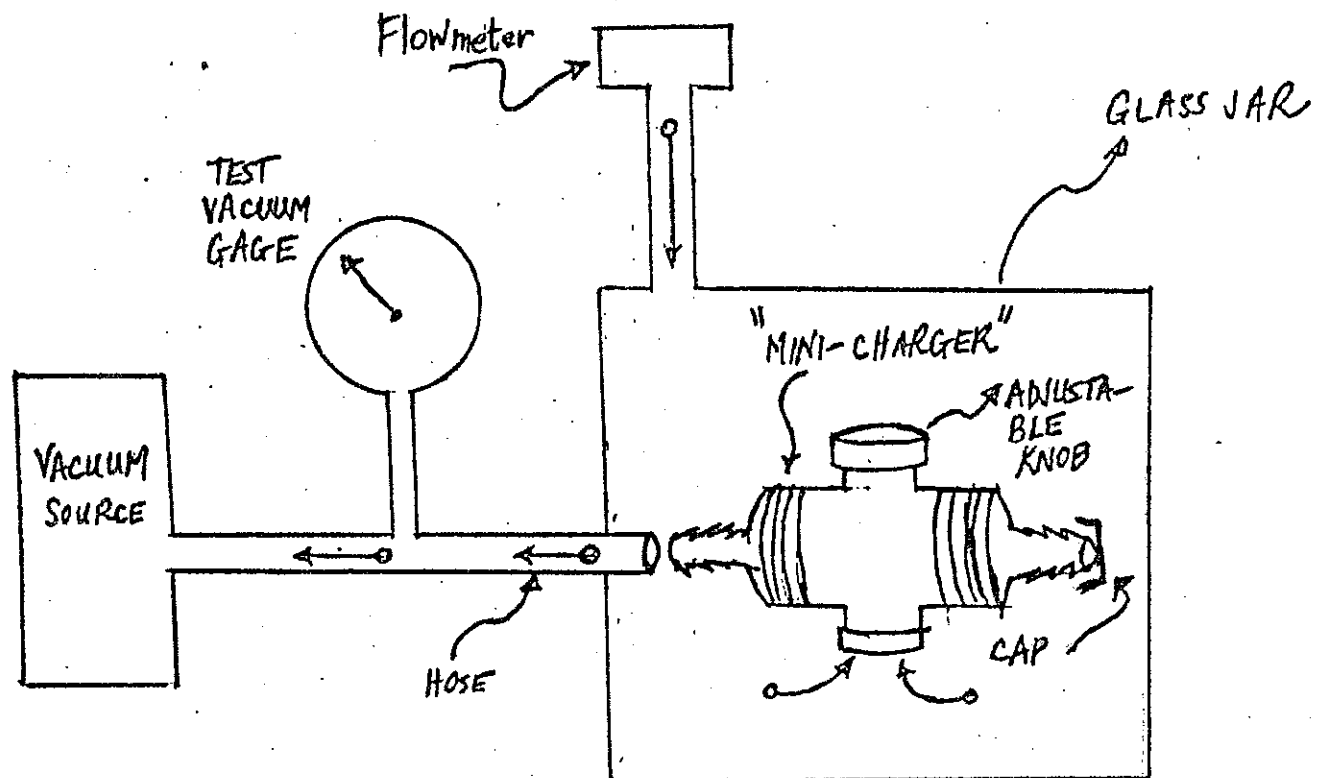


FIGURE 1. SCHEMATIC DIAGRAM FOR AIR FLOW TESTING OF
"MINI-CHARGER" DEVICE

○ →
 DIRECTION
 OF AIR FLOW

ADJUSTABLE KNOB SETTINGS COUNTER CLOCKWISE FROM FULLY CLOSED POSITION.

- A Fully tight -
- B 90° from fully tight position
- C 180° " " " "
- D 270° " " " "
- E 360° " " " "
- F 450° " " " "
- G 540° " " " "
- H 630° " " " "
- I 720° " " " "
- J 810° " " " "
- K 900° " " " "

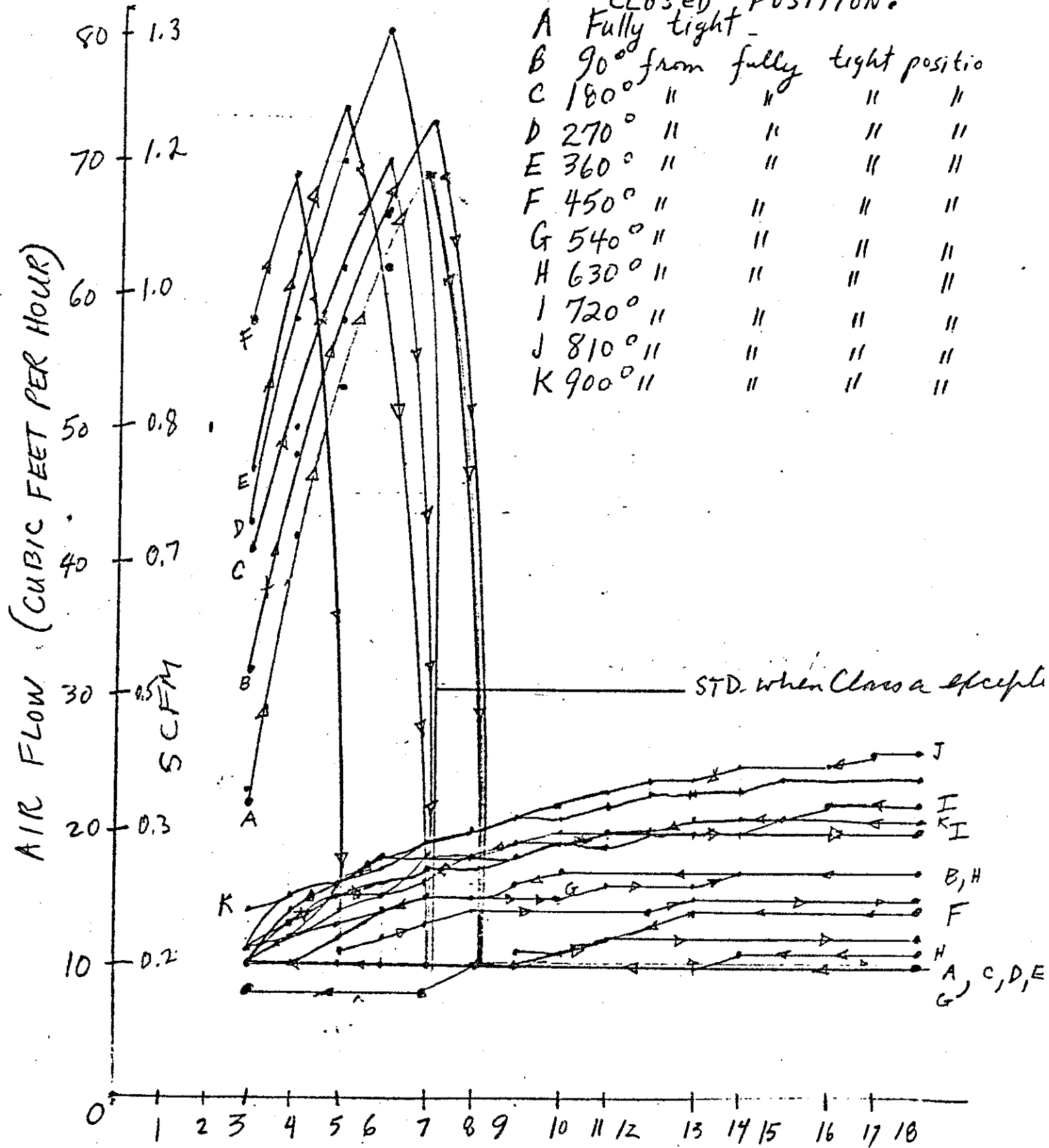


Figure 2 VACUUM (INCHES MERCURY)

