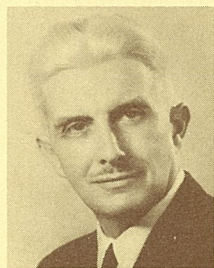


WHAT HAPPENED TO GASOHOL?

FREDERICK KRAISSL, JR., M. PHIL., P.E.

Chairman
The Kraissl Company, Inc.

In our January 1978 issue we published preliminary data giving latest information on Gasohol. Some of this should be repeated for further emphasis.



CONSULTING
ENGINEER

KRAISSL ASSOCIATES
The use of Gasohol would accomplish two objectives, 1. Reduce air pollution. 2. Increase our automotive fuel supply. It was reported that the Contra Costa Times conducted a study (all over again) proving that alcohol is a satisfactory fuel. It is cheap to produce, burns clean, meets emission standards without pollution control devices and can be made from just about any organic matter, wheat, corn, sorghum, corn stalks, sugar cane, sugar beets, fruits, vegetables garbage, trees, bushes, whatever, and I am quite sure the piles of sawdust we see alongside lumber producing plants would be most desirable new material.

The Times got a test car. Without modifying the engine, a mixture of alcohol and gasoline resulted in 35% better mileage, 25% more power and emissions well below EPA standards. The Times also published an ad for Studebaker trucks that appeared in the magazines and newspapers back in the 1930s, one of which is reproduced here for emphasis. Racing cars ran on almost pure alcohol in the 1920s because of its high efficiency as a fuel. During the 1930s a product known as Agrol a 10% blend of alcohol and gasoline was widely marketed in the Midwest. In the 1940s, Germany's ground war machines ran almost totally on alcohol fuels in the waning days of WWII.

Recently the State of Nebraska conducted a two million mile test involving

gasoline with a 10% alcohol (ethanol) content. There was no difference found in auto performance.

In the July 1978 issue we reported that a large New York newspaper had conducted tests on its staff cars. It was stated that Gasohol is generally agreed to be 10% Alcohol. This newspaper ran tests both on this and 15% Alcohol, and stated it was planning to increase the percentage to determine when efficiency slacks off. As of the time of this report, it was stated its cars ran cleaner, cooler, and slightly faster, putting out much less pollution than they did on plain gas.

Alcohol has a higher octane rating than gasoline and at one time was used to give gasoline a little more zip so cars accelerated faster. There is no reason to ever run out of alcohol. As indicated in the opening paragraphs, the production potential seems limitless. We chemists have always known there are two potential alcohols for this use, Methanol and Ethanol. It was recommended that ethanol be used for the tests, as it mixes a little better, and this from us, it is less poisonous and easier in our opinion, to produce. As a result of tests on a standard car with no equipment changes, poisonous carbon monoxide was cut more than 300%.

Now if the administration really wants to cut gasoline consumption by 10% in 1985, **we have it made now by the use of Gasohol.** If we go to 15% or better, we can obviously improve the situation. Ethanol runs about \$1.35 per gallon, but not too expensive to keep gas stations in Illinois and Nebraska from selling Gasohol at competitive prices. A manager of one gasoline station is reported he bought ethanol at \$1.34 per gallon and blended it with 40 cent a gallon regular unleaded gasoline and sold 30,000 gallons in a week and a half at 72.9 cents a gallon. This Gasohol pump was right alongside a premium gasoline pump selling at 75.9 cents a gallon. It should be borne in mind that alcohol upgrades gasoline into the premium bracket.

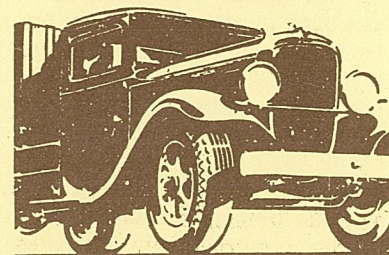
It is estimated that we could cut oil imports 20% by replacing 10% of gasoline with alcohol. It is our opinion that it is the job of the oil companies to take over this matter of supplying Gasohol. They have, in our opinion, everything

to gain and nothing to lose. It should not be too important which commodity they produce that will result in a profit. We are supposed to believe that competitive enterprise benefits the public. This could easily be competitive. Different areas would have different materials for producing ethanol. The oil companies have the distribution chain right down to the service stations with the fuel pumps. The oil companies are one of the basic energy producing companies. Forward moving countries must have sources of energy. Cut-backs in the use of automotive fuel by whatever means employed, slows down our activities instead of accelerating them.

The oil companies could just as well have ethanol distilleries for fuel, as they do have lead tetra ethyl plants. If the latter phase out, here is a new profitable replacement. The 1977 Food and Agricultural Act authorizes the Secretary of Agriculture to spend 60 million dollars for four alcohol distilleries, none of which, to our knowledge, have been built. This seems unnecessary for pilot distilleries for a product that has been tested and approved for more than sixty years. Undertaking the production of alcohol for Gasohol would mean solution of the problem of production on the farms and probable elimination of farm subsidies which would remove a load from the back of taxpayers.

ATTENTION
TO
SUGAR PLANTERS

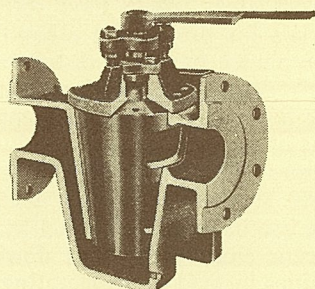
STUDEBAKER
Trucks



The New Studebaker Trucks are now built to use alcohol instead of gasoline, a saving to you of 45% on fuel. We now have a limited stock on hand, and are prepared to demonstrate and prove to you the saving you can make with Studebaker Trucks.

Bearing in mind that there is no way we can run out of organic material to manufacture the alcohol for Gasohol, for that material is constantly renewable, what is holding us back? Certainly, as conditions in countries that have been suppliers of crude oil jeopardize our imports, we need better reliance on products under our control. We can always use oil and the situation can change with changing governments, but it should be obvious that we need to be in control of the source of energy for the increasing needs of automotive transportation.

REDUCING THE SEEPAGE IN PLUG TYPE VALVES



CLASS 72 VALVE ASSEMBLIES
BULLETIN A1869

To those of us who have studied the production of plug type valves, several considerations are self evident, but must be included in any evaluation, while others need study so they become part of a composite approach toward better performance.

So let's enumerate:

1. Compatible taper by which we mean the taper of the plug must be the same as that of the housing to maximize contact or sealing properties. After careful machining to a standardized predetermined taper, it has been customary to lap the components together to obtain the best possible fit. This lapping process is a good example of achieving the maximum beneficial effect. Underlapping is obviously insufficient and overlapping produces increasing seepage between the high pressure side and low pressure side.

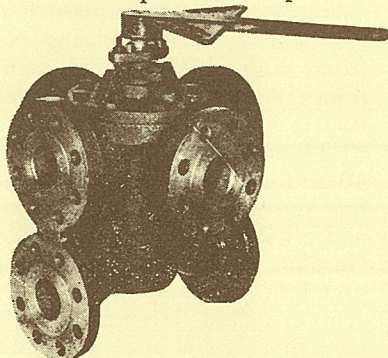
2. The foregoing is also affected by the angle of the taper selected. If the taper is too acute, a plug with a wedging action results and a plug wedged on its seat causes a very difficult valve to put back in operation. Many years ago, we experimented with a taper angle that compromises anti-wedging action with reasonable compactness, as it will be appreciated that as the selected wedge shape angle becomes more obtuse, the more the assembly will be spread out and the porting through the plug will become impractically complicated. There are valves with cylinders as plugs, but they do not establish a con-

tinuous contact fit, as they do not have the advantage of the taper of the plug, taking up wear within reasonable limitations.

3. It has been found that the differences between the surfaces of the plug and seat have pronounced effects on the seepage between the high and low pressure side. It has been our experience that assuming the same characteristics, a bronze plug against a ferrous seat will produce a tighter valve than a ferrous plug against a steel seat. Our explanation of this is that the bronze plug because of its surface characteristics, will better conform under pressure to the seat and therefore produce a tighter valve. However, there are applications where bronze cannot be used because of chemical reaction and the problem must be dealt with on a specialized basis, which will also be discussed.

4. It seems acceptable to state, that the greater the distance between ports in the plug and ports in the housing, again assuming all other conditions are the same, the better will be the seal and the parallel functions of reduced seepage rates. However, the porting should be such that the nominal area of the pipe size of each valve is not reduced so that flow is not restricted that would otherwise cause an increase in pressure drop across the valve. Consequently, this porting will cause an important percentage in discontinuity of mating surfaces, and must be taken into consideration when the plugs are lapped on their seats.

5. It will be obvious, of course, that seepage is a function of the viscosity of the fluid and we use this term in its full technical meaning against which the valve is closed. Plug valves with a very minor percentage of area for ports, have been used for many years with gases. However a gas has in most cases such a negligible viscosity for practical purposes that ports through the plugs handling gas can be restricted without undue pressure drop.



CLASS 72AA VALVE ASSEMBLY

Probably the most difficult combination is stainless steel plugs, functioning in combination with steel or stainless steel seats. For this combination,

lifting jacks have been mandatory as if ordinary stainless steel is turned against steel or stainless steel with which it is in contact, this can cause galling or scoring. The lifting device permits raising the plug from its seat, so that it may be turned through the operational angle and then returned to the seat, so that the valve function will be accomplished. One can never be sure that in a moment of distraction a careless operator will turn the valve plug, without the use of the lifting device, in which case the resultant galling or scoring, can produce a built in by-pass, greatly increasing plug leakage.

We have been experimenting with a porous steel coating of the stainless steel plugs, with the pores charged with teflon. This produces a mating surface that minimizes or eliminates galling or scoring when these companion parts are turned one against the other under differential pressure conditions. The results have been so conclusively satisfactory with liquids of negligible lubricity that lifting devices may be rendered unnecessary for many applications. The surface effect is also comparable to the bronze plug against the ferrous seat, where the surface temporarily conforms to that of the seat, producing comparable reduction in seepage to the bronze/steel combination. This surface appears sufficiently resilient, so that there is no permanent setting and the plug resumes its original contour when lifted from the seat. It will be recalled that for many services, lifting jacks were not required for the bronze-steel combination, and it appears quite probable that the same situation will apply to the coating as well. We therefore expect to issue price lists offering this coating with stainless steel plugs with and without lifting jacks.

DOUBLE A AND TRIPLE A VALVES

Both our AA Valves and AAA Valves will mate with so called ANSI Flanges, and in a letter addressed to customers for these units our President, Mr. R. C. Michel, explained the situation as follows:-

February 26, 1979

Gentlemen:

We have been furnishing to you over the years our standard Class 72-AAF (H) (S) (-1) duplex three-way transfer valves which are terminated with six port flanges that mate with ANSI commercial flanges of various classes and sizes.

In the October 1978 issue of Kraissl Quarterly (copy enclosed) we announced the availability of our Class 72-AAA (H) (S) (-1) valves which, in addition to our previous standards, have back spotfaced flanges, serrated flange contact faces, and slightly revised (upward) hydrostatic test pressures which are all enumerated on our enclosed print B3528J. The price increase for these "AAA" revisions is 10% above the basic "AA" pricing.

We will continue to process your orders where model number and pricing indicates the basic "AA" specification without regard to ANSI references but trust that you will specify the newer "AAA" model number at the higher price where required.

Your cooperation in making your requirements known to us is appreciated.

Cordially yours,
THE KRAISSL COMPANY, INC.
By
Robert C. Michel, P.E.
President

CLASS 72-AAA STEEL VALVES PER APPLICABLE ANSI SPECS.

PORT FLANGES PER ANSI B16.5 - 1977

1. Hydrotest — para. 8.3, p.9; table 3, p. 18.
2. Serrated flange raised faces—Para. 6.3.4.1., p. 5.
3. Flange thickness — Tables 10, 13, 19; Pp. 38 8.39, 42 & 43, 50 & 51; Para. 6.3, P. 5.
4. Back spot. facing — Para. 6.5, P. 6.

We hope the foregoing gives a clear presentation of our desire to meet the requirements of all customers and explains why there is a price differential between our valves of these differing specifications.

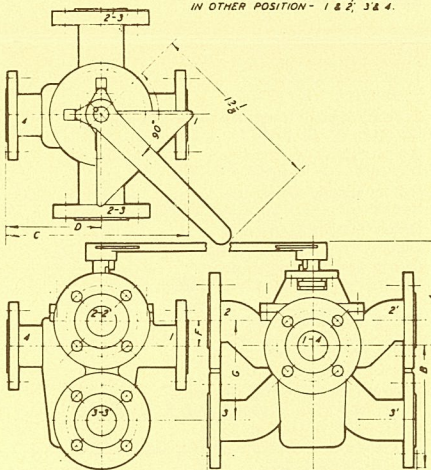
CLASS AA VALVES STEEL CONSTRUCTION

MODEL	SIZE	FLG. B.C. DIA.	R.C. DIA.	NO. BOLT DIA.	R.F. DIA.	MIN. A	MIN. B	MIN. C	MIN. D	MIN. E	MIN. F	MIN. G
150# ASA FLANGES - 450 PSIG HYDROSTATIC TEST PRESSURE												
72-37	1/2	5 3/8	4 1/8	3/8	2 1/2	7 1/2	7 1/2	9 3/8	1 1/2	10	1 1/2	6 3/8
72-39	3/4	6 1/2	5 1/8	1/2	3 1/8	9 1/2	9 1/2	12 1/8	2 1/8	12 1/2	2 1/8	7 1/8
72-41	1	7 1/2	6 1/8	5/8	4 1/8	11 1/2	11 1/2	15 1/8	3 1/8	15 1/2	3 1/8	8 1/8
72-43	1 1/4	8 3/4	7 3/8	3/4	5 1/8	13 1/2	13 1/2	17 1/8	4 1/8	17 1/2	4 1/8	9 1/8
72-47	2	10 1/2	9 3/8	1	6 3/8	15 1/2	15 1/2	19 1/8	5 1/8	19 1/2	5 1/8	10 1/8
72-49	2 1/2	11 3/4	10 3/8	1 1/8	7 3/8	17 1/2	17 1/2	21 1/8	6 1/8	21 1/2	6 1/8	11 1/8
300# ASA FLANGES - 1125 PSIG HYDROSTATIC TEST PRESSURE												
72-37	1/2	6 1/8	5 1/8	3/8	2 3/8	8 1/2	8 1/2	10 1/8	1 3/8	11 1/8	1 3/8	6 3/8
72-39	3/4	7 1/8	6 1/8	1/2	3 1/8	10 1/8	10 1/8	12 1/8	2 1/8	13 1/8	2 1/8	7 1/8
72-41	1	8 1/8	7 1/8	5/8	4 1/8	12 1/8	12 1/8	15 1/8	3 1/8	16 1/8	3 1/8	8 1/8
72-43	1 1/4	9 1/8	8 1/8	3/4	5 1/8	14 1/8	14 1/8	17 1/8	4 1/8	18 1/8	4 1/8	9 1/8
72-47	2	11 1/8	10 1/8	1	6 3/8	16 1/8	16 1/8	20 1/8	5 1/8	21 1/8	5 1/8	10 1/8
72-49	2 1/2	12 1/8	11 1/8	1 1/8	7 3/8	18 1/8	18 1/8	22 1/8	6 1/8	23 1/8	6 1/8	11 1/8
600# ASA FLANGES - 2225 PSIG HYDROSTATIC TEST PRESS.												
72-37	1/2	8 1/8	7 1/8	3/8	2 3/8	10 1/8	10 1/8	12 1/8	2 1/8	14 1/8	2 1/8	8 1/8
72-39	3/4	9 1/8	8 1/8	1/2	3 1/8	12 1/8	12 1/8	15 1/8	3 1/8	17 1/8	3 1/8	9 1/8
72-41	1	10 1/8	9 1/8	5/8	4 1/8	14 1/8	14 1/8	17 1/8	4 1/8	19 1/8	4 1/8	10 1/8
72-43	1 1/4	11 1/8	10 1/8	3/4	5 1/8	16 1/8	16 1/8	20 1/8	5 1/8	21 1/8	5 1/8	11 1/8
72-47	2	13 1/8	12 1/8	1	6 3/8	18 1/8	18 1/8	22 1/8	6 1/8	24 1/8	6 1/8	13 1/8
72-49	2 1/2	14 1/8	13 1/8	1 1/8	7 3/8	20 1/8	20 1/8	24 1/8	7 1/8	26 1/8	7 1/8	14 1/8
PLUS 1/8" R.F. ON 150# & 300# FLGS. & 1/4" R.F. ON 600# FLGS.												

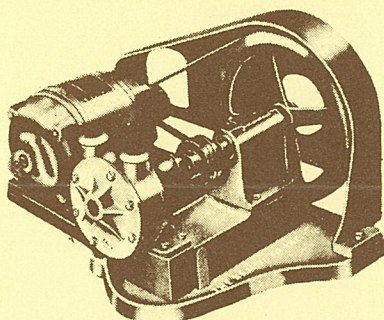
CLASS AAA VALVES STEEL CONSTRUCTION

MODEL	SIZE	FLG. B.C. DIA.	R.C. DIA.	NO. BOLT DIA.	R.F. DIA.	MIN. A	MIN. B	MIN. C	MIN. D	MIN. E	MIN. F	MIN. G
150# ASA FLANGES - 450 PSIG HYDROSTATIC TEST PRESSURE												
72-37	1/2	5 3/8	4 1/8	3/8	2 1/2	7 1/2	7 1/2	9 3/8	1 1/2	10	1 1/2	6 3/8
72-39	3/4	6 1/2	5 1/8	1/2	3 1/8	9 1/2	9 1/2	12 1/8	2 1/8	12 1/2	2 1/8	7 1/8
72-41	1	7 1/2	6 1/8	5/8	4 1/8	11 1/2	11 1/2	15 1/8	3 1/8	15 1/2	3 1/8	8 1/8
72-43	1 1/4	8 3/4	7 3/8	3/4	5 1/8	13 1/2	13 1/2	17 1/8	4 1/8	17 1/2	4 1/8	9 1/8
72-47	2	10 1/2	9 3/8	1	6 3/8	15 1/2	15 1/2	19 1/8	5 1/8	19 1/2	5 1/8	10 1/8
72-49	2 1/2	11 3/4	10 3/8	1 1/8	7 3/8	17 1/2	17 1/2	21 1/8	6 1/8	21 1/2	6 1/8	11 1/8
300# ASA FLANGES - 1125 PSIG HYDROSTATIC TEST PRESSURE												
72-37	1/2	6 1/8	5 1/8	3/8	2 3/8	8 1/2	8 1/2	10 1/8	1 3/8	11 1/8	1 3/8	6 3/8
72-39	3/4	7 1/8	6 1/8	1/2	3 1/8	10 1/8	10 1/8	12 1/8	2 1/8	13 1/8	2 1/8	7 1/8
72-41	1	8 1/8	7 1/8	5/8	4 1/8	12 1/8	12 1/8	15 1/8	3 1/8	16 1/8	3 1/8	8 1/8
72-43	1 1/4	9 1/8	8 1/8	3/4	5 1/8	14 1/8	14 1/8	17 1/8	4 1/8	18 1/8	4 1/8	9 1/8
72-47	2	11 1/8	10 1/8	1	6 3/8	16 1/8	16 1/8	20 1/8	5 1/8	21 1/8	5 1/8	10 1/8
72-49	2 1/2	12 1/8	11 1/8	1 1/8	7 3/8	18 1/8	18 1/8	22 1/8	6 1/8	23 1/8	6 1/8	11 1/8
600# ASA FLANGES - 2225 PSIG HYDROSTATIC TEST PRESS.												
72-37	1/2	8 1/8	7 1/8	3/8	2 3/8	10 1/8	10 1/8	12 1/8	2 1/8	14 1/8	2 1/8	8 1/8
72-39	3/4	9 1/8	8 1/8	1/2	3 1/8	12 1/8	12 1/8	15 1/8	3 1/8	17 1/8	3 1/8	9 1/8
72-41	1	10 1/8	9 1/8	5/8	4 1/8	14 1/8	14 1/8	17 1/8	4 1/8	19 1/8	4 1/8	10 1/8
72-43	1 1/4	11 1/8	10 1/8	3/4	5 1/8	16 1/8	16 1/8	20 1/8	5 1/8	21 1/8	5 1/8	11 1/8
72-47	2	13 1/8	12 1/8	1	6 3/8	18 1/8	18 1/8	22 1/8	6 1/8	24 1/8	6 1/8	13 1/8
72-49	2 1/2	14 1/8	13 1/8	1 1/8	7 3/8	20 1/8	20 1/8	24 1/8	7 1/8	26 1/8	7 1/8	14 1/8
PLUS 1/8" R.F. ON 150# & 300# FLGS. & 1/4" R.F. ON 600# FLGS.												

DESIGNED FOR CONTINUOUS FLOW.
PORT INTERCONNECTIONS -
IN POSITION SHOWN - 1 & 2, 3 & 4.
IN OTHER POSITION - 1 & 2, 3 & 4.



MORE ABOUT THE CLASS 60H SERIES PUMPS



The Class 60H series is offered for pressures up to 150 pounds psig in our Reduction Drive models. In appearance they are practically indistinguishable from our Class 60 series but that is where the similarity ends. All of these pumps rely on the bearing construction for their longevity. The bearing construction of the 60H series is completely different from the 60 series. The displacement elements in the 60H series are carried on bearings utilizing rollers with provision for lubrication other than the lubricity of the oil being pumped. This involves a wholly different internal construction and accounts for the difference in price.

Again emphasis is placed on reduction drive assemblies as this permits running at speeds not only consistent with the viscosity of the oil being handled but also at speeds giving the capacity necessary for the application. It is obvious that this must meet the requirements plus a reasonable surplus for recirculation back to the supply tank. However pumps that are run direct connected to motor can rarely be selected on the basis of a reasonable over capacity. In most cases the displacement of direct motor drive pumps is very much over capacity for the requirements. This means wasted energy and in many cases an over priced pump and motor assembly.

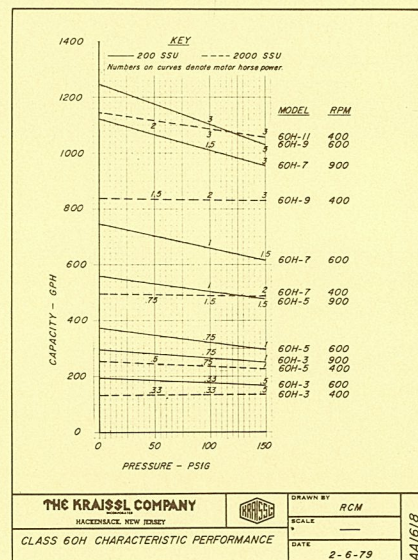
This is avoided by the use of our reduction drive pumps, as our units can be run at the speeds desired to meet both of these conditions. Also, if oil supplies change, the speed of the pumps can be changed to accommodate with usually only a change in the V belt drive sheaves.

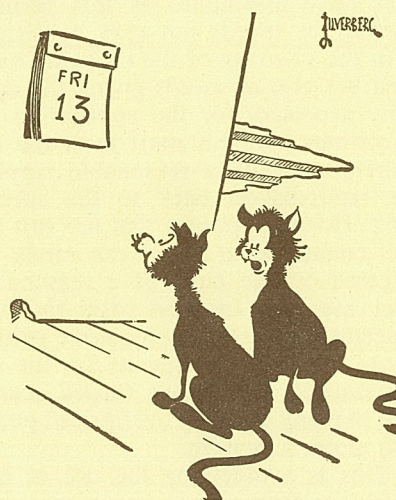
Appreciating this fact, many of our customers have requested characteristics curves of what performance can be expected of these pumps at usual speeds, with the understanding that intermediate capacities can be easily computed at proportional speeds.

It is cautioned, however, that the selection should not be too close to allow for differences in pumps due to accepted tolerances and the fact that it would be prudent to allow for a little wear over a reasonable period of time. One of the great advantages of this arrangement is that if this occurs a slight stepping up of the pump speed usually will meet this condition.

Accordingly the following family of curves is submitted for guidance and larger size data sheets are available on request by reference to the indicated data sheet number.

CHART NUMBER AA1618





"Wow! It's our day to tie up traffic!"

Judge: "Do you understand what is meant by the word Oath?"

Witness: "Yes, your Honor, I do, I was right behind you when your ball went into the water on the ninth hole".

VACATION NOTICE

The Vacation Period, while never painless, was found least disturbing last year when arranged for the last week in July and first week of August. We are scheduling complete shut down during this period.



THE KRAISSL COMPANY

INCORPORATED

HACKENSACK, NEW JERSEY 07601

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HOME OFFICE

We have reserved the areas of Connecticut, Metropolitan New York, including the Hudson Valley, Long Island, New Jersey and eastern Pennsylvania less Philadelphia District for coverage by Kraissl Company personnel.

Northeast Region

Boston-Cooper Corp.
Manor Parkway
Salem Ind. Pkwy., Salem, N. H. 03079
Capt. C. V. Watson
Maiden Cove Lane
Cape Elizabeth, Maine 04107

Eastern Region

Filtration Unlimited
Buffalo & John Streets
Akron, N. Y. 14001
R. C. White Co.
3065 Enterprise Blvd.
Bethel Park, Pa. 15102
Gelman Industrial Equipment
1327 Barton Drive
Fort Washington, Pa. 19034
Jobe & Co., Inc.
2857 Greenmount Ave.
Baltimore, Md. 21218

Southeast Region

Power Equipment Co.
1307 West Main St.
Richmond, Va. 23201
Dillon Supply Company — Main Office
Raleigh, N. C. 27602
Dillon Supply Company
Durham, No. Carolina 27702
Dillon Supply Company
Rocky Mt., No. Carolina 27801
Dillon Supply Company
Goldsboro, No. Carolina 27530
Dillon Supply Company
Charlotte, No. Carolina 28201
Boiler Supply Company, Inc.
490 Craighead Street
Nashville, Tenn. 37204
601 Van St., N. W.
Knoxville, Tenn. 37921
Applied Engineering Co., Inc.
P. O. Box 506, Orangeburg, S. C. 29115
Spotswood Parker & Co.
721 Miami Cir. NE, Atlanta, Ga. 30324
Florida Filters, Inc.
5570 N. E. 4th Ave., Miami, Fla. 33137
Procter & Co.
Box 26158
Birmingham, Ala. 35226

North Central Region

Comb & Groves, Inc.
336 W. Eight Mile Rd.
Ferndale, Mich. 48220
Hetler Equipment Co.
P. O. Box 1904
Grand Rapids, Mich. 49501

Central Region

M. Huffman Sales Co.
3404 Upton Ave.
Toledo, Ohio 43613
W. G. Taylor Co.
1900 Euclid Bldg., Cleveland, Ohio 44115
The Jordan Engineering Co.
P. O. Box 30071
Cincinnati, Ohio 45230
T. A. Heidenreich Co., Inc.
2525 E. 54th Street
Indianapolis, Ind. 46220
Tobra Engineering Co.
5438 Milwaukee Ave.
Chicago, Illinois 60630
A. K. Howell Co.
2683 S. Big Bend Blvd.
St. Louis, Mo. 63143

South Central Region

Creole Engineering Co.
P. O. Box 23159, Harahan, La. 70183
Jack Tyler Engineering Co.
6112 Patterson Ave.
Little Rock, Ark. 72209
Albert Sterling & Assoc., Inc.
P. O. Box 66099, Houston, Texas 77006

Northwest Region

Baxter-Rutherford, Inc.
P. O. Box 24324 Terminal Annex
Seattle, Washington 98134

Western Region

Jav Besore & Assoc.
1690 Plymouth St.
Mountain View, Cal. 94043
Power Engineering Co.
364 W. North 600th St.
Salt Lake City, Utah 84110
Killam Gas Burner Co.
1240 S. Bannock St.
Denver, Colorado 80223

Southwest Region

Wagner Hydraulic Equip. Co.
2089 Westwood Blvd.
Los Angeles, California 90025
Engineered Sales Co.
5150 N. 16th St., Suite A-126
Phoenix, Arizona 85016

Canada—Ontario and Quebec Provinces

Kirk Equipment Ltd.
375 Victoria Ave.
Montreal, Quebec, Canada H3Z 2N1
P. O. Box 508
Knowlton, Quebec, Canada
K. C. Hamilton Equip. Ltd. — Marine

Canada—British Columbia Province

Les Hall Filter Service Ltd.
346 E. Esplanade
North Vancouver, B. C. V7L 1A4

Canada—Alberta Province

H. F. Clarke Limited
5220-1A Street S. E.
Calgary, Alberta, Canada

Hawaii

Foster Equipment Co.
719 Ahua St.
Honolulu, Hawaii 96803

Mexico

Ingenieria Termo Industrial, S. A.
Apartado 20-360
Mexico 20, D. F., Mexico

BULK RATE
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Hackensack, N. J.