2018 DONOR IMPACT REPORT
In a biennial survey, members of the National Fluid Power Association (NFPA) consistently rank workforce development as the most challenging issue their companies face. This is likely because not enough technical colleges and universities are teaching fluid power to their students.

As a result, NFPA has identified growing the fluid power workforce as one of its primary strategic priorities. It is central to its mission of strengthening the fluid power industry. NFPA seeks to increase the number of educated technicians and engineers embarking on careers in fluid power.

The NFPA Education and Technology Foundation is a tax-exempt, charitable organization, affiliated with NFPA, that is dedicated to meeting this workforce development need. Through the generous support of our donors, we are:

- Creating more educated fluid power technicians, by funding student outreach and education programs, designed to create a pathway into the fluid power industry; and
- Creating more educated fluid power engineers, by funding research and education programs, designed to better engage academic faculty in the teaching of fluid power.

Because of your support, our programs are helping to change the talent pool available to our industry. More young people are aware of the fluid power industry. More 2-year technical college and 4-year university graduates have specific training in fluid power. More universities have research facilities and education programs focused on fluid power. And more partnerships between these schools and our industry are increasing access to highly talented candidates.

This is truly our mission—yours and ours—and it is working. Your donations will make sure it works for many years to come.

Best Regards,

Eric Lanke
President and CEO
NFPA Education and Technology Foundation
NFPA EDUCATION AND TECHNOLOGY FOUNDATION
PATHWAY INTO THE FLUID POWER INDUSTRY

OUTREACH & EDUCATION PROGRAMS BUILDING A PATHWAY INTO THE FLUID POWER INDUSTRY

MIDDLE SCHOOLS

Fluid Power Action Challenge
A design/build competition for eighth graders that introduces fluid power in a format that is both fun and engaging.

Student Career Connections
Orientation programs conducted by NFPA members to provide fluid power plant tours and activities to high school students.

Fluid Power Robotics Challenge
Scholarships awarded to high school students that effectively use fluid power in their FIRST and NRL robots.

High Schools

Teaching and Laboratory Grants
Money to establish teaching materials and state-of-the-art teaching laboratories that create fluid power programs at 2-year technical colleges.

Fluid Power Careers Portal
An online portal where students post resumes and fluid power companies post jobs.

Tech Schools

Fluid Power Action Challenge Champions
Twenty-five NFPA member companies and education partners from across the country have been recognized as Fluid Power Action Challenge Champions for their efforts in organizing and running Fluid Power Action Challenge events in their local communities. Learning to use fluid power, they have not only made serious investments of both time and money, but have also helped spread information about our industry and reaped the benefits that come with connecting their organizations to the schools and science classrooms where the industry’s future employees are learning fluid power for the first time.

Those Fluid Power Action Challenge Champions are:

- Bennett Mills Middle School
  1 annual event, engaging 96 total students
- Caterpillar
  3 annual events, engaging 2,240 total students
- Cleveland Community College
  4 annual events, engaging 728 total students

FLUID POWER ACTION CHALLENGE

Fluid Power Action Challenge

The Fluid Power Action Challenge is a competition that challenges middle or high school students to solve an engineering problem using fluid power. The students work in teams to design and build a fluid power mechanism and then compete against other teams in a timed competition.

The Fluid Power Challenge has many benefits. It:
- Actively engages students in learning about fluid power.
- Gives support and resources to teachers for science and technology curriculum.
- Creates a learning environment where math and science are fun.
- Encourages students to practice teamwork, engineering, and problem-solving skills.
- Introduces students to careers in the fluid power industry.

Hundreds of individuals in NFPA member companies and education partner institutions have been involved in mentorship, classroom activities, and events related to the Fluid Power Action Challenge, which have engaged more than 17,500 students to date.

IN TOTAL, OUR FLUID POWER ACTION CHALLENGE CHAMPIONS HAVE ORGANIZED
86 EVENTS IMPACTING
8,735 STUDENTS.

Cooper Middle School
2 annual events, engaging 122 total students

Daman Products Company
8 annual events, engaging 9,056 total students

Deltoy Fluid Products
8 annual events, engaging 2,304 total students

Eisenhower High School
2 annual events, engaging 36 total students

FORCE America
3 annual events, engaging 200 total students

Georgia Tech University
2 annual events, engaging 136 total students

Gulliver
1 annual event, engaging 90 total students

HUSCO International & Waukesha STEM Academy
4 annual events, engaging 332 total students

Jering Middle School
2 annual events, engaging 370 total students

Komatsu Mining Corp Group
1 annual event, engaging 34 total students

Master Pneumatic
4 annual events, engaging 560 total students

Mequon School District
1 annual event, engaging 36 total students

Micromatic
1 annual event, engaging 20 total students

Milwaukee School of Engineering
10 annual events, engaging 2,684 total students

Parker Hannifin
2 annual events, engaging 44 total students

Pennsylvania Small Business Education Fund
4 annual events, engaging 488 total students

Price Engineering
3 annual events, engaging 264 total students

Purdue University
4 annual events, engaging 236 total students

University of Minnesota
5 annual events, engaging 352 total students

Triton Girls Summer Camp
2 annual events, engaging 180 total students

Wojanis Supply Company
5 annual events, engaging 1,125 total students

Valley View Junior High School
1 annual event, engaging 1,44 total students

University of Minnesota
5 annual events, engaging 352 total students

Triton Girls Summer Camp
2 annual events, engaging 180 total students

Wojanis Supply Company
5 annual events, engaging 1,125 total students

Valley View Junior High School
1 annual event, engaging 1,44 total students

University of Minnesota
5 annual events, engaging 352 total students
The Fluid Power Robotics Challenge is a scholarship program that launched with the 2016-17 school year. In collaboration with FIRST Robotics and the National Robotics League (NRL), each year the NFPA Foundation offers one merit-based scholarship to a high school student using fluid power in their robot design. The scholarship, set at $10,000 per year for up to four years, may be utilized to study engineering at any accredited technical college or university in the United States.

The goal of the Fluid Power Robotics Challenge is to bring an awareness of fluid power options in robotics to high school students and to stimulate increased use of fluid power products in the United States. To date, 8 schools have received teaching grants and 9 schools have received laboratory grants. This is up 28% from last year. This year, a total of 2,035 teams used fluid power in their design.

**Robotics Challenge Scholarship Winner**

Spencer Tiegs, the 2017 NFPA Robotics Challenge Scholarship winner, has been very busy since winning his scholarship. Not only is he attending the Milwaukee School of Engineering for mechanical engineering as part of the University Scholars Honors Program, he also continues to coach and mentor FIRST Robotics high school students and is part of the Formula Hybrid team at MSOE. Spencer recently completed an internship at HUSCO International, Inc.

**Student Career Connections**

Student Career Connections is a free and flexible program that helps fluid power industry professionals host area high school students at their company facility — giving the students a tour, building a fluid power classroom kit with them, and answering questions about the industry and careers. Many NFPA members coordinate these activities with the extra attention created by Manufacturing Day®.

To date, the program has given more than 2,200 students a peek into real-world fluid power applications and careers.

**Teaching and Laboratory Grants**

Through our Fluid Power Teaching and Laboratory Grant Programs, we are helping 2-year technical schools and colleges establish the teaching materials and state-of-the-art teaching laboratories that are needed to embed fluid power into their training curriculum.

To date, 8 schools have received teaching grants and 9 schools have received laboratory grants. In 2017-18, our teaching and laboratory grant program funds were used to support the launch of the first FAMTEN hub school at Waukesha County Technical College (WCTC). $25,000 was allocated to purchase fluid power training platforms to be used at eight high schools near WCTC. In the future, the NFPA Foundation will provide scholarships to help these high school students attend the fluid power and applied mechatronics degree program at WCTC.

**Fluid Power Careers Portal**

The NFPA’s Fluid Power Careers Portal is a tool designed to provide students being taught fluid power with information about job openings, employment statistics and scholarship opportunities. They can post their resumes free of charge. Companies that are at least Bronze-level donors in our Pascal Society—whose funding is critical if we are to continue the outreach and education programs that result in these fluid power candidates—can use the portal to search student resumes and post their available positions.

**Teaching Grants**

Central Community College, Grand Island, NE
Cleveland Community College, Shelby, NC
Hennepin Technical College, Eden Prairie, MN
Ivy Tech Community College, Columbus, IN
Kaskaskia College, Centralia, IL
Texas State Technical College, Waco, TX
Trinton College, River Grove, IL
Vernon College, Vernon, TX

**Laboratory Grants**

Angeloina College, Lufkin, TX
Central Community College, Grand Island, NE
Cleveland Community College, Shelby, NC
Eastern Iowa Community College, Davenport, IA
Hennepin Technical College, Eden Prairie, MN
Macomb Community College, Warren, MI
Marshalltown Community College, Marshalltown, IA
South Central College, North Mankato, MN
Trinton College, River Grove, IL
To create more educated engineers, the NFPA, the NFPA Foundation, and their partner, the Center for Compact and Efficient Fluid Power (CCEFP), conduct a number of research and education programs, designed to better engage academic faculty in the teaching of fluid power.

NFPA’s focus is increasingly on helping funded research faculty build more fluid power education into their undergraduate engineering courses. To educate these students in fluid power and produce graduates that are attractive hires for the fluid power industry, we are building a full fluid power curriculum for insertion into these and other core engineering courses. Fluid power curriculum resources developed through our programs are posted on the NFPA website for faculty from universities across the United States to access and use to teach their engineering students about fluid power.
RESEARCH PROJECTS
10 PROJECTS HELPING TO GROW FLUID POWER ON UNIVERSITY CAMPUSES

CCEFP’s Industry Engagement Committee is the volunteer structure tasked with selecting and guiding the research projects that will engage academic faculty and graduate students in investigating the pre-competitive research needs of the fluid power industry. Its membership includes major donors to the NFPA Foundation, including those at the Gold and Silver levels of the Pascal Society.

Over the previous ten years, the CCEFP has sponsored more than 270 such projects, which helped to add more than 100,000 square feet of fluid power laboratory space to its universities, to increase the number of fluid power advanced degrees awarded by those universities by more than 500%, and to increase the number of fluid power educators on those campuses by a factor of 10.

For the past two years, the NFPA Foundation has provided funding for 10 additional research projects, which, as determined by the CCEFP Industry Engagement Committee, were awarded as follows:

**Control and Prognostic of Electro-Hydraulic Machines**

Student Researcher: Riccardo Bianchi, Purdue University
Faculty Advisor: Andrea Vacca, Purdue University

This project focuses on investigating advanced electro-hydraulic techniques to optimize adaptive control, reduce application oscillations, and conduct hydraulic system diagnostics and prognostics under different operating conditions. It has investigated both hydraulic crane and wheel loader applications for controlling oscillations that occur in these types of machinery.

**Controlled Stirring Power Unit**

Student Researcher: Seth Thomas, Vanderbilt University
Faculty Advisor: Eric Barth, Vanderbilt University

The project addresses limitations in the current options for power supplied to mobile robots and exoskeletons through the development of a quieter, more energy-dense, compact, and portable fluid power supply using a stirring device. Such advancements would enable the use of fluid power technology in a variety of military, medical, manufacturing, and construction applications. The stirring device can use a number of highly energy-dense, flexible fuel or available heat sources to create hydraulic or pneumatic fluid power in an easily scalable design.

**Efficient, Integrated, Freeform Flexible Hydraulic Actuators**

Student Researcher: Jonathan Sleigham, Marquette University
Faculty Advisor: Mark Hagurka, Marquette University

This project sets to advance current hydraulic actuator technology by focusing on the use of flexible fluid actuators and the additive manufacturing methods needed to produce them. It differentiates itself from existing actuation technologies most prominently through the dramatic reduction in component and system weight that comes with producing this new actuation technology via advanced manufacturing methods, opening up many new applications to fluid power solutions.

**Four-Quadrant Multi-Fluid Pump / Motor**

Student Researcher: James Marshand, Purdue University
Faculty Advisor: John Lumieres, Purdue University

This project focuses on the design and simulation of digital pumps and motors for multi-fluid operation as well as evaluation of their feasibility. It has built upon existing technology and research by working toward a novel mechanical control for digital pumps and motors in pursuit of making this technology approach more feasible.

**Free Piston Engine Based Off-Road Vehicles**

Student Researchers: Keyan Liu and Chen Zhang, University of Minnesota
Faculty Advisor: Zongxuan Sun, University of Minnesota

This project focuses on the design, control, and testing of free piston engine pumps for off-road vehicles, a potentially transformative architecture. It has differentiated itself from existing technology approaches by controlling the hydraulic engine, in lieu of variable pumps, to generate the required pressure and flow for the vehicle’s hydraulic actuation systems, including both linear and rotary motions. Solutions to improve vehicle fuel efficiency and energy storage while reducing emissions and environmental impact have also been investigated.

**Hybrid MEMS Proportional Fluid Control Valve**

Student Researcher: Nathan Hagstrom, University of Minnesota
Faculty Advisor: Thomas Chaves, University of Minnesota

MEMS scale piezoelectric materials to create ultra-efficient miniature proportional pneumatic valves have been studied by CCEFP researchers for a number of years now, but the manufacturing challenges to overcome have proven to be quite daunting. The purpose of this project has been to accelerate the commercialization potential of this innovative approach by leveraging both MEMS-based and conventional elements in a novel “hybrid” configuration. By doing so, the resulting valve stands to not only decrease the power required to drive comparable pneumatic valves by three orders of magnitude, but also create the fastest responding pneumatic valves known.

**Portable Pneumatically Powered Orthoses**

Student Researcher: Grish Krishnan, University of Illinois at Urbana-Champaign
Faculty Advisor: Elizabeth Hsieh-Wecksler, University of Illinois at Urbana-Champaign

The project focuses on the design and analysis of a soft pneumatic sleeve for arm orthosis. This is expected to contribute to orthotic control mechanisms and clinical treatment strategies, both of which are areas that have significant potential for advancements. The final design will be lighter and more compact than what is currently available and will have enhanced power and performance. In addition to making strides in orthotics, this research will also drive the use of compact fluid power technologies in other human-scale devices.

**Investigation of Noise Transmission through Pump Casing**

Student Researcher: Paul Kabfleisch, Purdue University
Faculty Advisor: Monika Iwantschyna, Purdue University

This project focuses on noise modeling techniques for swash plate type axial piston machines. The optimized models are being validated by experimental results. It will contribute to the existing body of knowledge for how noise is both generated and transmitted through fluid power components.

**Hydraulic Systems for Non-Medical Applications**

Student Researchers: Ryan Foss, University of Minnesota and Nathan Hagstrom, University of Minnesota
Faculty Advisors: James Marschand, Purdue University and Mark Hagurka, Marquette University

This project builds upon existing technology and investigates the feasibility of applying variable fluid pump/motors to non-medical applications. This project has been investigating the pre-competitive research needs of the fluid power industry to create advanced fluid power capabilities for less invasive surgical and non-medical applications.

**Variable AC Hydraulic Pump / Motor**

Student Researchers: Mengtang Li, Vanderbilt University; Erik Barth, Vanderbilt University; James Van de Ven, University of Minnesota

Hydraulic systems today can be classified as DC, or direct flow, hydraulics. This project investigates the modeling, design, and development of AC hydraulic systems. This project builds upon the existing CCEFP variable linkage piston pump that is both compact and efficient even under low displacement operating conditions. It also greatly expands the existing body of knowledge for applying existing variable displacement pumps to alternating flow AC hydraulic circuits, including multi-actuator systems.

**Other Fluid Power Research Grants**

In addition to its support of the CCEFP projects, the NFPA Foundation has also funded individual pre-competitive research projects designed to connect graduate and undergraduate students to the study of fluid power and expand the capabilities of their host institutions to research and teach fluid power.

To date, 3 schools have received 4 of these research grants.

**Simulation, Rheology, and Efficiency of Polymer Enhanced Fluids**

Student Researchers: Duval Johnson, Uma Shantini Ramasamy, University of California – Merced; Mercy Cheekolu, Pawan Panwar, Milwaukee School of Engineering
Faculty Advisors: Ashle Martin, University of California – Merced; Paul Michael, Milwaukee School of Engineering

This project focuses on measuring how a fluid’s polymer structure affects hydraulic power transmission in pursuit of formulating more efficient hydraulic fluids. It builds upon previous research by incorporating tribometer testing, high pressure rheology studies, and molecular dynamics simulations into the research methods.

**Variable AC Hydraulic Pump / Motor**

Student Researchers: Mengtang Li, Vanderbilt University; Ryan Foss, University of Minnesota
Faculty Advisors: Eric Barth, Vanderbilt University; James Van de Ven, University of Minnesota

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To date, 3 schools have received 4 of these research grants.

**Iowa State University**

- Dielectric Spectroscopic Sensor Development for Hydraulic Fluid Contamination Detection
- An Investigation of Dielectric Spectroscopic Contamination Sensing in a Compressed Air Stream

**Purdue University**

- Design, Simulation and Control of Hydraulic System Topographies with Integrated Energy Recovery
- Pneumatic Exhaust Gas Recovery

Through these research projects, the NFPA Foundation is engaging current and helping to build the careers of future academic faculty who will be in a position to teach fluid power to thousands of undergraduate engineers on their campuses.
TEACHING, LABORATORY AND CURRICULUM GRANTS
7,100+ UNDERGRADUATE STUDENTS TAUGHT FLUID POWER EACH YEAR AT 4-YEAR UNIVERSITIES

Through our Fluid Power Teaching, Laboratory and Curriculum Grant programs, we are helping the academic faculty impacted by our fluid power research projects to teach more fluid power in the university setting. These grants help to create and disseminate fluid power curriculum and provide a pathway for funded faculty to add fluid power to their undergraduate mechanical engineering programs.

Each grant creates curriculum that facilitates the teaching of fluid power to dozens or hundreds of students on each campus. At last count, NFPA’s 4-year university school education partners collectively report teaching fluid power to more than 7,100 students.

Teaching Grants
- Georgia Institute of Technology, Atlanta, GA
- Illinois Institute of Technology, Chicago, IL
- Iowa State University, Ames, IA
- Lawrence Technological University, Southfield, MI
- Marquette University, Milwaukee, WI
- Massachusetts Institute of Technology, Cambridge, MA
- Milwaukee School of Engineering, Milwaukee, WI
- Montana State University, Bozeman, MT
- Purdue University, West Lafayette, IN
- Rochester Institute of Technology, Rochester, NY
- University of Illinois at Chicago, Chicago, IL
- University of Illinois at Urbana-Champaign, Urbana-Champaign, IL
- University of Minnesota, Minneapolis, MN
- Western Michigan University, Kalamazoo, MI
- Western New England University, Springfield, MA
- Worcester Polytechnic Institute, Worcester, MA

Laboratory Grants
- Milwaukee School of Engineering, Milwaukee, WI
- Western Michigan University, Kalamazoo, MI

Curriculum Grants
- Lawrence Technological University, Southfield, MI
- Ohio University, Athens, OH
- Western Michigan University, Kalamazoo, MI

TO DATE
16 SCHOOLS HAVE RECEIVED TEACHING GRANTS
2 SCHOOLS HAVE RECEIVED LABORATORY GRANTS, AND
3 SCHOOLS HAVE RECEIVED CURRICULUM GRANTS.

Fluid power is a subject that I did not know much about before I started my studies in the Engineering Technology major. I feel lucky that fluid power is part of the curriculum because it provides me with an understanding about how some equipment and machinery work and it gives me an edge over some potential candidates for employment in the future.

– Marlena Silva,
Eastern Iowa Community College
STUDENT TEAMS FROM 13 UNIVERSITIES PARTICIPATED IN THE SECOND YEAR OF THE NFPA VEHICLE CHALLENGE.

The Fluid Power Vehicle Challenge is a unique engineering design/build competition that embeds in the capstone design course at participating universities. It strives to promote original thinking in a competitive setting by combining two technology platforms that are not normally associated with one another — human-powered vehicles and fluid power.

The first, as exemplified by the bicycle, is recognized as extremely efficient in terms of input vs. output. The second presents more of a challenge in terms of efficiency, especially at low speeds. A fluid powered vehicle, then, presents undergraduate engineers with a familiar yet challenging platform for change. By combining this unlikely pair, the Vehicle Challenge hopes to create an environment that results in uncommon connections and breakthroughs, while supporting learning and the growth of fluid power industry knowledge.

The Fluid Power Vehicle Challenge Community is the volunteer structure tasked with mentoring, coaching and judging the student teams participating in the Vehicle Challenge. Its membership includes major donors to the NFPA Foundation, including those at the Gold and Silver levels of the Pascal Society.

Eight companies sent representatives to the final event to act as competition judges and to meet the student participants in person.

- Danfoss Power Solutions
- Eaton
- FORCE America Inc.
- HUSCO International, Inc.
- HYDAC
- Iowa Fluid Power
- Parker Hannifin
- SunSource

The team from Murray State University won the overall competition, with teams from multiple universities placing competitively in the program’s other award categories, including best paper/presentation, best design, best workmanship, and the program’s three head-to-head competitions: a sprint race, and efficiency and endurance challenge.

Additional support for this year’s program was provided by:

- Danfoss Power Solutions, the program’s final event sponsor and host
- LubeTech, the program’s official fluid supplier
- Parker Hannifin
- SunSource/Eaton Corporation, the program’s official parts supplier

Many student participants admitted that the Vehicle Challenge was their only exposure to fluid power in their four-year engineering curriculum, greatly underscoring the need for this program. This year, the Vehicle Challenge again achieved all four of its key objectives:

- Stimulate education in practical hydraulics, pneumatics, and sustainable energy devices for motion control.
- Provide students with experience in real-world engineering under a strict timeline of designing, simulating, building, testing and demonstrating their designs.
- Stimulate innovative thinking for designing and testing potential new technologies or concepts integrated into a vehicle platform.
- Provide an industry recruitment opportunity for high potential engineering seniors by engaging directly with practitioners in the field.
The Pascal Society is the NFPA Foundation's annual giving society that has raised more than $2.6 million for fluid power outreach, education, and research programs. Pascal Society funds support the full range of Foundation programs highlighted in this report. Pascal Society donors combine their financial and volunteer contributions in one concerted effort, developing the resources, tools, and people needed to meet the future technology and workforce needs of the U.S. fluid power industry.

Pascal Society Donors as of June 30, 2018

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<th>Gold Members</th>
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NFPA EDUCATION AND TECHNOLOGY FOUNDATION
2018 DONOR IMPACT REPORT

16
17
Class of 2018
FORCE America
HUSCO International
International Fluid Power Society
Quality Control Corporation

Class of 2017
Linde Hydraulics
Lubrizol
Proportion Air
Woodward HRT

Class of 2016
Afton Chemical Corporation
Bobcat Company
Chevron
Donaldson Company, Inc.
Evonik Oil Additives USA, Inc.
ExxonMobil
HYDAC Technology Corporation/
Schrader Industries LLC
Hydra-Power Systems, Inc.
Hydraquip, Inc.
Netshape Technologies
Poclain Hydraulics, Inc.

Class of 2015
CNH Industrial
Rail Corporation
Moog Inc.

Class of 2014
Danfoss Power Solutions
Eaton Corporation
Gates Corporation
ROSS Controls

Class of 2013
Bimba Manufacturing Company
Bosch Rexroth Corporation
Caterpillar Inc.
Deltrol Fluid Products
Parker Hannifin Corporation

Class of 2012
Enfield Technologies

Class of 2010
Sun Hydraulics Corporation

LEGACY BUILDERS

The NFPA Education and Technology Foundation extends gratitude to the many generous donors who share our mission of meeting the workforce development needs of the U.S. fluid power industry.

The following organizations have achieved Legacy Builder status—cumulative giving of $25,000 or more—as of our last recognition year, ending April 30, 2018.

THANK YOU DONORS

The NFPA Education and Technology Foundation extends gratitude to the many generous donors who share our mission of meeting the workforce development needs of the U.S. fluid power industry.

The following individuals and organizations made a donation in our last recognition year—between May 1, 2017 and April 30, 2018.

ACE Controls
Afton Chemical Corporation
Aggressive Hydraulics
Air Logic
Aladd
Almo Manifold & Tool Company
Alstom Steel Corporation
AMETEK APT
ANGG-HYDOS
ASCO Numatics
Ashton Gear
Automation Machine Controls
AVENTICS Corporation
Baldor-Reliance JSC
Bailey International
Barkdale Control Products
Bimba Manufacturing Company
Bobcat Company
Bosch Rexroth Corporation
Casapa Corp.
Cateylex Inc.
Chippewa Instrument Laboratory
CNH
Corner Industries Inc.
Concentric Blackbird Inc.
Cross Company
Curtis-Wright Sprague
Cavo
Daman Products Company
Danfoss
Delta Computer Systems
Delta Power Company
Deltrol Fluid Products
Design World
DLH Fluid Power
Donaldson Company
Dura-Bar
Eaton Corporation
Enfield Technologies
Eric Lankel
Evonik Oil Additives USA
ExxonMobil Research and Engineering
Fabco-Air Inc.
Fairfield Manufacturing Company
Faulkner
FD-Group America
Festo Corporation
Fluid Hydraulic Group
Fluid Power Educational Foundation
Fluid Power Society
FORCE America
Gates Corporation
Gott Research Resources
HAIWE Hydraulik GmbH & Co KG
Henry Kohring
Hidaco-America
HUSCO International
HYDAC Technology Corporation
Hydradyne
Hydraulics
Hydraulics—Power Systems
Hydrapak
Hydro Extrusion North America
Hydrotech
Idemitsu Kosan
IM Precision Engineering
Industrial Hard Drives
Informa
Issa Fluid Power
JRP Industries
JCB
Jeff Hardy
JEM Technical Marketing Company
K.R. West Company
Kaman Fluid Power
Kawasaki Precision Machinery
Kraft Fluid Systems
KYB Americas Corporation
KYB Japan
Lehigh Fluid Power
Linde Hydraulics Corp
Lubrizol
Main Manufacturing Products
Marti Wendel
Master Pneumatic-Detroit
Micromatic
Moog
Mosley’s Production Machining
Motion Industries, Inc.
MP Electronics USA Inc.
Muncie Power Products, Inc.
National Tube Supply Company
NetShape Technologies
QRM Controls
Rankin Hannifin
PART Solutions
Plymouth Tube
Poclain Hydraulics
Power Systems Inc. Florida
Price Engineering
Proportion Air
QCC – Quality Control Corp
R & J Cylinder & Machine
Randy Mudge
Remanco Hydraulics
Rosenboom Machine & Tool
ROSS Controls
RT Dylgetz
Ryan and Patty Hunstad
Schmid Inc.
Scott Tannan
Shell Lubricants
Sierra Machinery
Simens
Starcyl Cylinders
Stauff Corporation
Steelhead Composites
Stelco Canada
Stuchi S.p.A.
Sun Hydraulics Corp
Swiss Automation Inc.
The Toro Company
Twin Disc, Inc.
Ultra Clean Technologies Corp
Wadsworth Fluid Power
Wandfluh of America, Inc.
Wearwell Supply Co Inc
Worwick Machine Supply Co.
Woodward HRT
World Wide Fittings Corporation
Yates Industries, Inc.

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