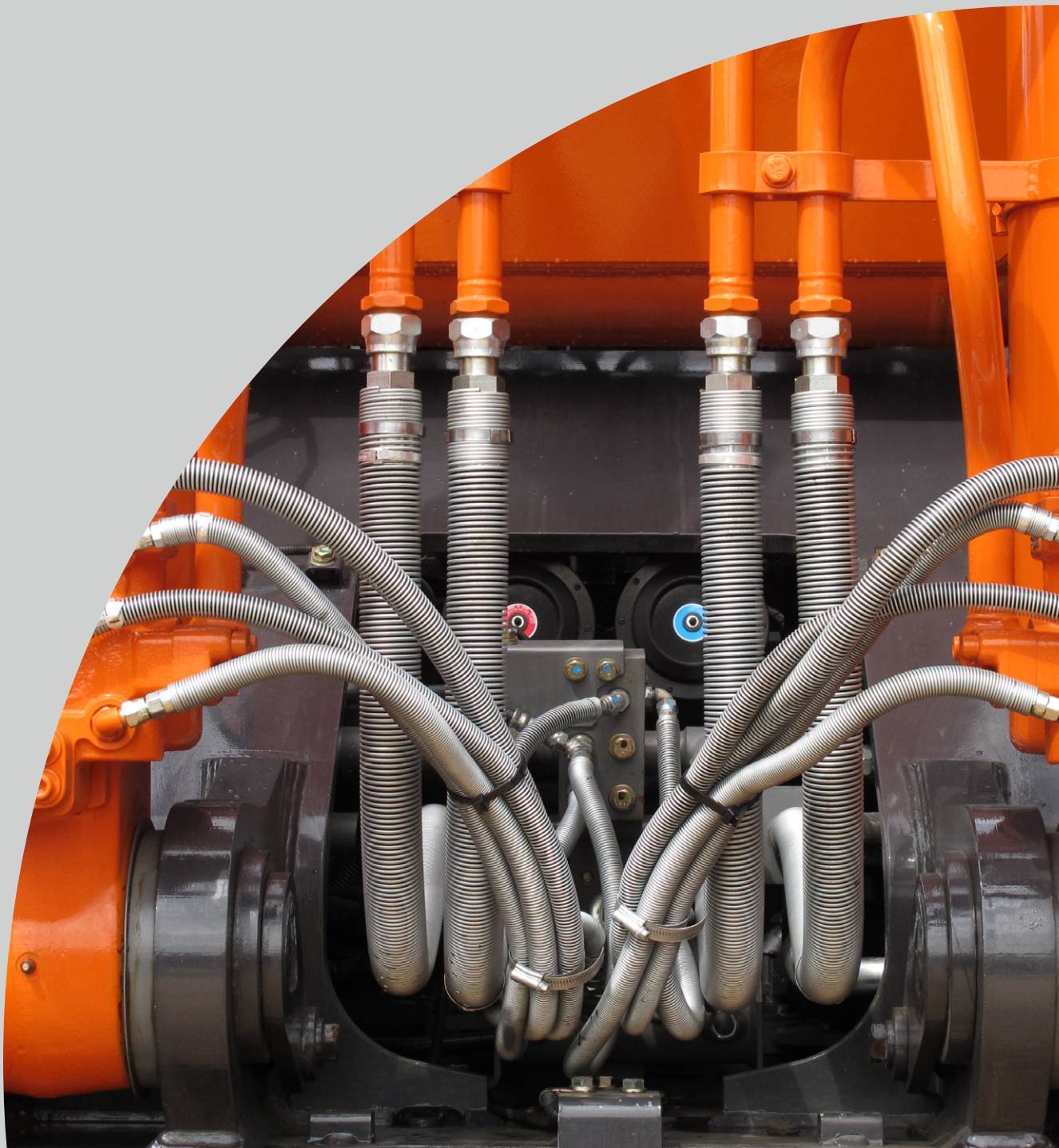
Fluid Power

Business Report
2017 – 2021



Editorial

Christian H. Kienzle

Hartmut Rauen

Dear Members,

The last few years since our last general meeting in 2017 in Augsburg/Germany have truly been a tough one. A chase for sales records with peaks in pneumatics (2018) and hydraulics (2019) - then a cyclical slowdown already in 2019 – and then came Corona.

The pandemic hit all personal and professional aspects of life equally. Short-time work, changing work patterns, mobile working, quarantines, the social and health system, disrupted global supply chains: everything established was overnight subjected to an almost unimaginable, maximally harsh stress test. In this phase it became apparent that good cooperation in the interpersonal area, but also in industry, is the formula for success for getting through the crisis.

Nevertheless, against this background, the Fluid Power association has reached a new high with 216 members (as of Sept. 2021). New digital formats and events have been developed and the networks in the field of markets, research, technology and trade fairs have been expanded. This has also paid off for our members: after an incredible catch-up in the first half of 2021, pneumatics has almost reached its 2018 peak and hydraulics has already exceeded its 2019 peak. The joint success of our industry supports our commitment and encourages us to continue striving for greater competitiveness with a global perspective.

Especially in view of the fragile and dynamic political situation against the backdrop of global dictatorship, Brexit, protectionism in China and the USA, as well as various intra-European skirmishes, not only German introspection but also an external view is important for us. We are counting on a strong Europe. That is why we invite European manufacturers to get involved and participate with us.

Strategically, we succeed in identifying technology trends and important future topics – such as digitization, sustainability, competition with electromechanics or educational topics – at an early stage and setting the right impulses. We provide implementation assistance and guidelines and take on a constitutive role. To this end, the board of the association has set up strategic

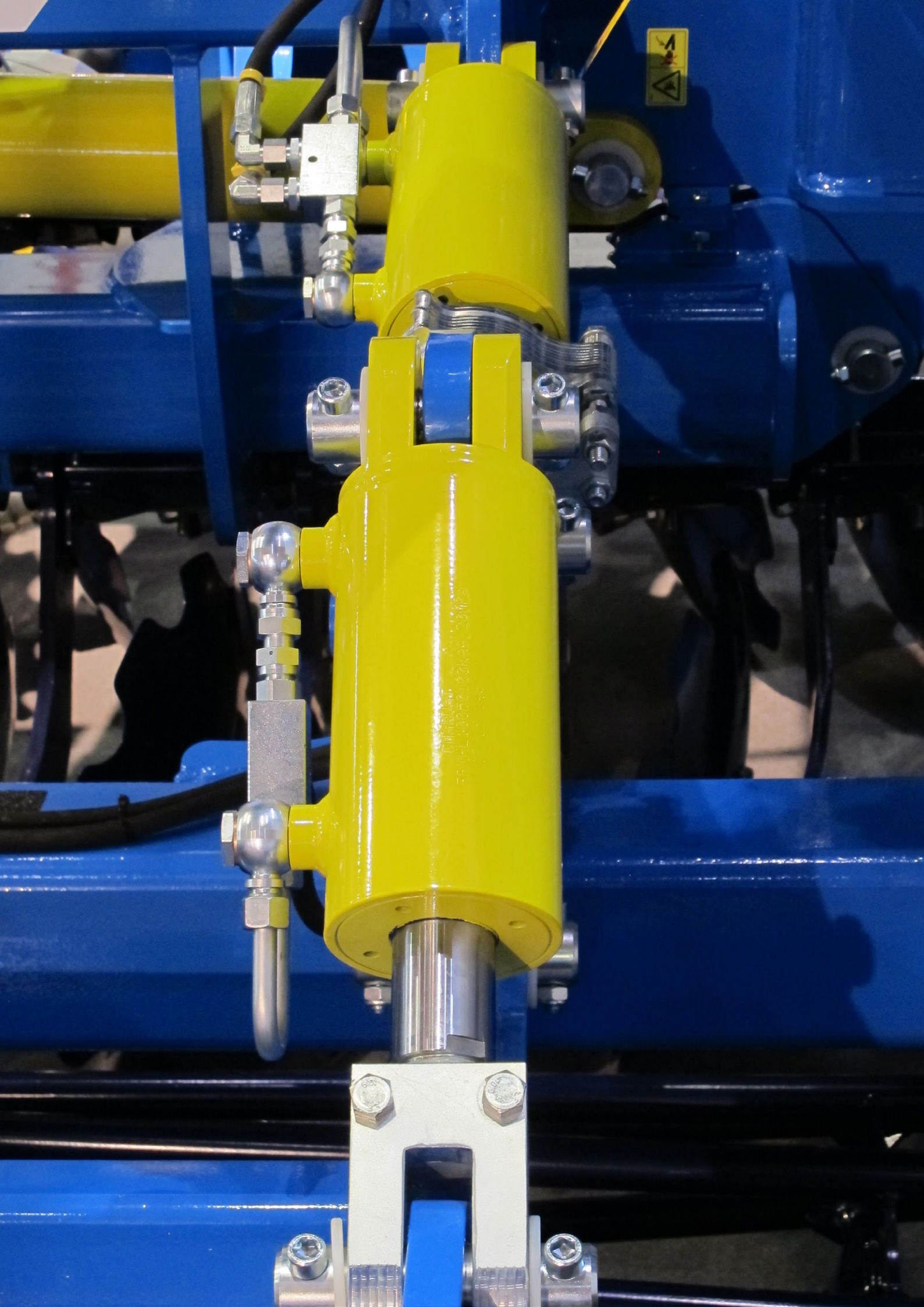
working groups. Their activities are intended to ensure that we continue to be successful as an intelligent and sustainable technology and that we are the drivers and not the driven ones. The activities go hand in hand with central initiatives in the VDMA on the digital twin, wireless communications for machines or topics relating to the carbon footprint and climate-neutral production. Fluid power provides intelligent, connected, sustainable solutions for the smart factory as well as for mobile machines.

We are well positioned as an industry and the prospects for our industry are good. We will tackle the challenges we face together.

Thank you for your commitment to the VDMA, for being part of this strong community that has proven itself even in difficult times! We have good reasons to look into the future with confidence and look forward to continuing the successful collaboration with you.

Christian H. Kienzle
Chairman of the Board
of the Fluid Power Association

Hartmut Rauen
Managing Director
of the Fluid Power Association



VDMA Fluid Power

German Fluid Power is one of the most important supplier sectors to industry worldwide. Whether construction or agricultural machinery, machine tools, robotics and automation, shipbuilding, aerospace technology etc. – without fluid power nothing would work. How did this internationally highly competitive industry experience the Corona crisis?

Review

Fluid Power, as a supplier sector for mechanical engineering and the entire industry, was one of the first industries to defy the Corona pandemic in its economic development. While almost the entire world was still assuming a catastrophic economic trend a year ago, Fluid Power was already feeling a slow but steady recovery in autumn 2020. Initially driven primarily by exports to non-EURO countries, above all China, but also to the USA, demand from Europe and other regions finally picked up as well. Nevertheless, German Fluid Power had to close 2020 with a decline compared to 2019: Hydraulics turnover was 4.6 billion EURO, which corresponded to a minus of 14 percent. Pneumatics achieved an industry turnover of 2.4 billion EURO and was thus minus 7 percent below the level of the previous year.

Current Situation

In the current year 2021, the declines of the difficult year 2020 were overcome, even the turnover and incoming order values of the year 2019 were exceeded. Incoming orders have soared to unimagined heights. In figures, this is expressed as follows: Hydraulics plus 61 percent and pneumatics plus 33 percent (January to September 2021/2020). Turnover is lower due to the lead times. Hydraulics is up by 23 percent, pneumatics by 25 percent.

The growth in turnover could be even higher if the capacities, especially personnel and material, were available in sufficient quantity and quality. The shortage of qualified skilled workers is once again making itself felt, this time perhaps even more seriously than ever before, because the labour market is almost empty due to the good economy. Even temporary workers are difficult to be found.

In addition, material supplies are also a concern, both in terms of type and logistics. Companies are suffering from disruptions in global supply chains and massive shortages of metals, plastics, semiconductors, chips and microelectronics.

Prospects

Overall, however, the full order books are causing optimism in the industry. For 2021, sales growth in fluid power is expected to be well into the double-digit range (as of September 2021).

Network and Collaboration

The board of the association is composed of senior representatives of the industry elected by the general meeting. At the general meeting in November 2021, the board will be elected for the next four-year term. It determines the strategic orientation of the association.

The economic and technical **expert networks** of the Fluid Power association also offer many opportunities for networking and collaboration:

- Economic Committee – central body for industry-relevant questions and topics
- Working groups: Market research on hydraulics, market research on pneumatics, trade fairs/marketing (together with the Power Transmission association), three working groups on sealing technology, Machinery Directive, Ecodesign Directive, Pressure Equipment Directive, functional safety, hydraulic cylinders, fluid sensors and digitization, as well as various ad hoc technical working groups.
- Standards committees: DIN (NAM) 060-36, CEN, ISO

The **VDMA Future Business Competence Centre** opens future topics in mechanical engineering – also for fluid power, for example artificial muscles in the context of biologisation. Trend radar and scenario studies help VDMA members to identify trends and disruptions for the industry at an early stage and make them usable. Best practices and new methods for futurology and innovation management are exchanged in the Corporate Foresight expert group.

The **VDMA Startup Machine**, as part of this competence centre, introduces members to promising start-ups and thus helps to quickly bring new trends into application.

The Fluid Power association benefits greatly from the close cooperation with the Fluid Power Research Fund.

At European level, CETOP, the umbrella organisation of the European Fluid Power industry, represents the economic and technical interests of fluid power.

Management meetings in China and India support local contacts and are organised by the VDMA representative offices in the corresponding countries.

Executive Board Fluid Power
Expert Networks Fluid Power
Future Business & Startup Machine

European and International Community

International cooperation is very important in fluid power. There is also a strong international network at association level, partly due to the good and trusting cooperation with other associations.

CETOP – Umbrella Organisation of the European Fluid Power Industry

Through its 19 member associations, CETOP represents the interests of more than 1,000 companies in the European fluid power industry with a domestic market of around 14 billion EURO and about 70,000 employees. This means that CETOP covers almost the whole of Europe.

CETOP offers its members a wide range of services: European and international market data, the online buyers' guide CETOP Directory, education and training initiatives, monitoring of European legislative initiatives, interpretation of EU Directives for the industry, position papers to help with arguments, etc.

The German Fluid Power association is strongly committed to CETOP and has been running the General Secretariat and the Secretariat of the Economic Commission for many years.

ISC – International Fluid Power Statistics Committee

At ISC, CETOP cooperates with the associations from China, Canada, India, Japan, Mexico, Taiwan and the USA. This cooperation results in market data and economic information of the global fluid power industry. This data is not available from any other source and is exclusively available to the member companies of the participating associations. The secretariat of the ISC is also in the hands of the association through CETOP.

International Fluid Power Summit Meeting

Every two years, during the HANNOVER MESSE in Germany, the Fluid Power association hosts this international summit meeting. The member companies have the opportunity at these meetings to obtain first-hand information about economic and general aspects in various countries, to make new contacts and to expand existing ones.

www.cetop.org

Fluid power is an industry with global customers and networks. In international competition, we need to work even more closely together in Europe and across industries. In addition to CETOP, the European VDMA membership opens up new potential for us and allows us to be successful together internationally.

Karl Haeusgen, President of the VDMA and Chairman of the Supervisory Board HAWE Hydraulik SE

Market Information and Economic Data

Market information and economic data are often in the focus of Fluid Power member companies. They have access to a range of national and international market information tailored to their interests. Our own surveys within our membership and international cooperation with associations worldwide ensure a comprehensive market and economic picture of fluid power.

The Fluid Power association offers its members a wide range of market information. The source for this is, among other things, its own surveys within the membership. A high degree of representation – 85 to 90 percent – ensures that the data is highly informative. A detailed plausibility check by the Fluid Power association is a matter of course.

Such meaningful and up-to-date data for fluid power is not available from any other source. The Hydraulics and Pneumatics Working Groups are closely involved in the design of the concept. As a result, the surveys are tailored to the wishes of the companies. The results are exclusively available to the participating member companies.

European and international market information is also on offer for members. Through CETOP and ISC, there is close cooperation with the European and international fluid power associations. More than 20 associations are involved.

National and international statistics build on each other in terms of nomenclature and definitions. This means that the data can be consolidated and thus, is meaningful at European and global level.

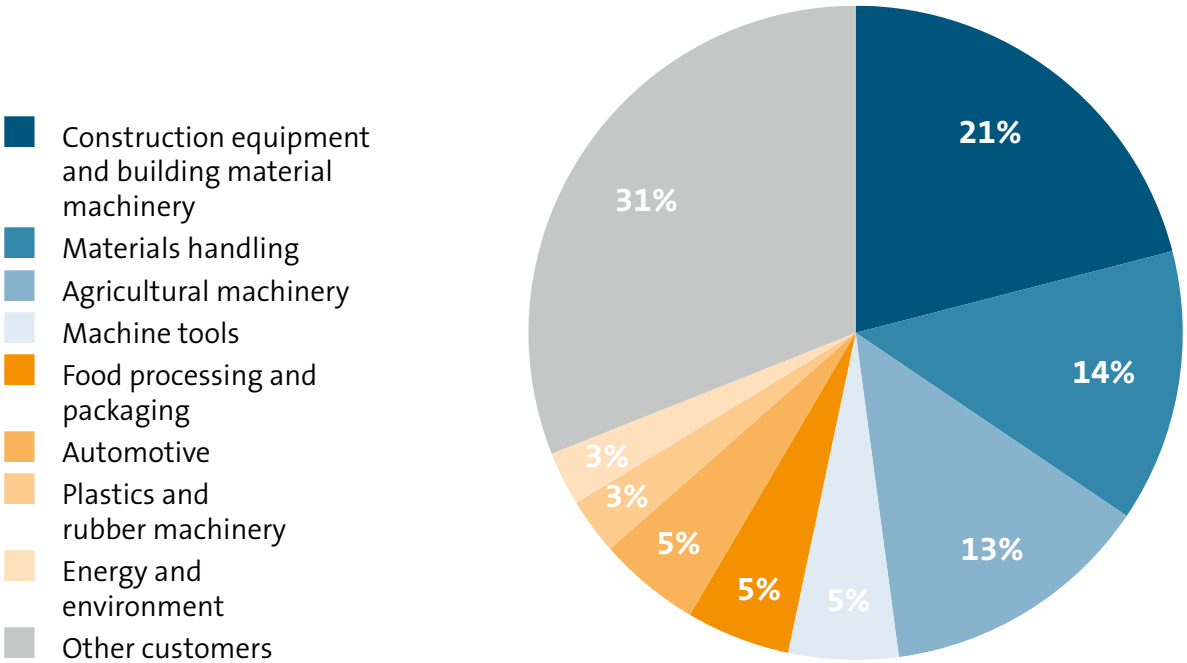
Through its integration into the VDMA, the association can also provide its members with information on economic developments in customer industries.

This enables the Fluid Power association to offer its members an up-to-date, comprehensive and well-rounded picture of fluid power. This is exemplified in the publication „Data on Fluid Power“ – a new quarterly publication that is very popular with member companies. The new monthly evaluations for industrial hydraulics and mobile hydraulics also contribute to the comprehensive picture of fluid power.

ISC International Statistics Committee

Main Customer Markets Hydraulics

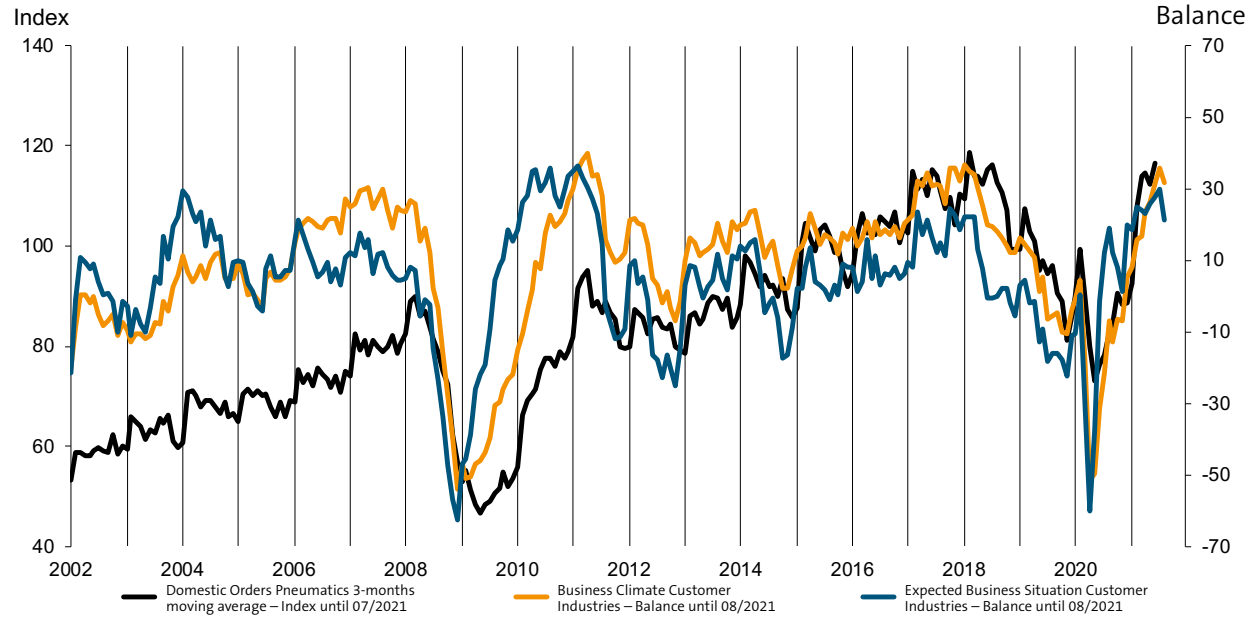
in % of the domestic sales 2020



Source: VDMA

Pneumatics Leading Indicators

Business Climate + Expected Business Situation Customer Industries, aggregated (58.7 %)* Domestic Orders Pneumatics



* Percentage according to Customer Groups Survey Pneumatics 2020

Source: Ifo Institute and VDMA-Statistics

Source: VDMA

Beacon Projects and Activities

Working Groups of the Board on Future Topics

To be technologically and economically successful in the future, the board of the association has started four strategic working groups on central and future-relevant topics.

Working Group Digitization

Industrie 4.0 and the interoperability of fluid power products are central challenges for all companies in the mechanical and plant engineering sector. The working group has initiated and prioritised activities to ensure connectivity and interoperability.

Throughout the entire product life cycle, representative use cases of the ‚Digital Customer Journey' were selected in the interaction between manufacturers, OEMs and end customers, and information and data relevant in critical situations were identified by special task forces. This data was reported to the Fluid Power ECLASS expert groups, which will standardize the properties by the end of 2021.

At the same time, relevant asset administration shell sub-models were defined, which will be standardized in parallel and then published via the „Industrial Digital Twin Association" (IDTA) initiated by the VDMA.

Working Group Sustainability

Not only on the part of legislators, but also in society, environmental awareness and the demand for sustainable solutions are increasing. The industry is already facing demands for lower energy consumption, resource efficiency, more eco-friendly fluids, etc. For the future, it is to be expected that in addition to environmental or product carbon footprints, further contributions to sustainability goals, especially regarding energy efficiency and circular economy, will have to be made.

The Fluid Power Research Fund initiated the twelve-month „Carbon Footprint meta-study – CO_2 balance of fluid power components in production". Within the framework of this self-financed study, ifas of RWTH Aachen University in Germany will also participate in a VDMA-wide initiative whose goal is the uniform and consistent determination of the carbon footprint across the entire mechanical engineering sector.

Working Group Competition Electromechanics

Fluid power solutions play out their strengths millions of times over in mechanical engineering plants and systems as well as in mobile machinery. In the increasing competition with electromechanical solutions, optimised electrical solutions are often compared with established, sometimes outdated fluid power solutions.

However, modern fluid power as a drive technology does not need to shy away from comparison with electromechanics: thanks to constant R&D activities and customer-oriented consulting in the design of complex systems, enormous savings potentials are possible in modern fluid power. Further advantages – especially regarding the increasing sus-

tainability requirements – result from the specific advantages of fluid power such as robustness and overload safety, high forces and power density, small installation space, safety, durability and flexible (re-)use in a wide variety of applications.

The working group has set itself the goal of supporting and defending the market position of fluid power against electromechanics with positive arguments. Image-building campaigns and publications in digital media and social networks are primarily planned for this purpose.

Working Group Education

There are fewer and fewer fluid power lectures at German universities and many professors and lecturers are leaving the teaching profession without a successor. This leads to two equally disadvantageous phenomena: Firstly, fluid power companies can access less qualified but urgently needed specialist personnel. On the other hand, OEMs and customers lack qualified engineers who can competently compare and evaluate different technologies and use the best application-specific solution from a technical and economic point of view.

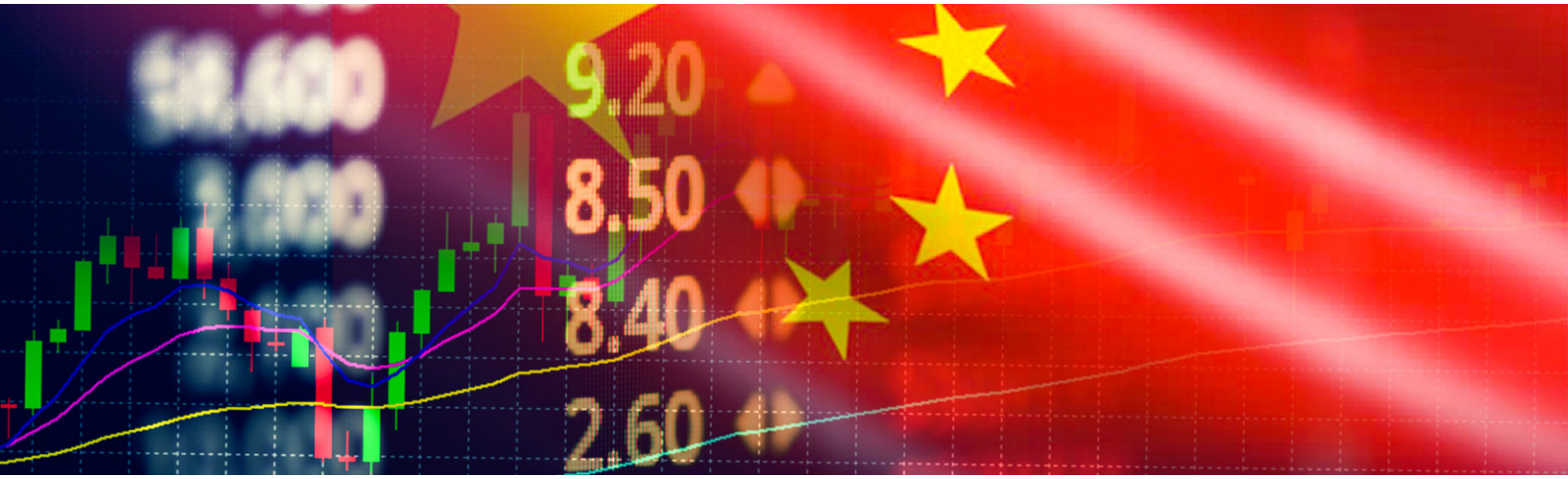
Three activities were therefore started by the working group on education:

- University map of Germany: Identification of institutes where research and teaching on fluid power topics takes place and analysis of the contents
- Specifications for teaching: description of the expectations of industry for teaching content in hydraulics, pneumatics and sealing technology, including topics from IT, control engineering and mechatronics
- Evaluation framework for research projects: Identification of research topics considered relevant and desirable by industry (recommendations and at the same time basis for evaluation of proposed joint research projects).

The activities of the working group are not possible without participation and dialogue with the universities. For this reason, consultation and close coordination is carried out by representatively selected representatives of the universities and the vocational training centres. The VDMA's activities in the area of higher education policy and quality in teaching in the **VDMA-Project Maschinenhaus** and in the **Mechanical Engineering Junior Research Foundation** for vocational education and training also provide a good basis for this.

Board Working Groups on Future Topics
Maschinenhaus
Mechanical Engineering Junior Research Foundation

Fluid Power Study: Competition and Strategy in China



China has now overtaken Germany as the world's leading exporter. Although Germany continues to hold the top position in fluid power, Chinese companies are catching up noticeably in terms of technology and market share, partly with the help of massive state subsidies. Nevertheless, China remains the most important export market for German fluid power after the USA. However, with initiatives such as „Made in China 2025" and ongoing five-year plans, the Chinese state is demanding and promoting its industry massively, to the disadvantage of German fluid power as well. To support its members in their activities and business in China, the German Fluid Power association is having a **China study carried out by Euro Asia Consulting (EAC)**.

Through intensive research and interviews with market experts, selected competitor companies and representatives of customer industries, results and statements on the Chinese market, competitors, framework conditions and strategies of the Chinese government as well as recommendations for action will be developed.

The results of the study will be presented and published at the general meeting of the VDMA Fluid Power association in November 2021.

The following links provide further up-to-date information on the main topic on the **VDMA Europe and China** homepage, in particular the **study „Made in China 2025"**.

Fluid Power Study (EAC)
Europe and China
Study Made in China 2025

Web Conferences on the International Market Situation

In cooperation with CETOP and ISC, the association offers its members the chance to get first-hand information about the economy both in Germany and in other countries with the new web conferences on the economy.

National Web Conferences on the Economy

During the period when no face-to-face events were possible, the Fluid Power association supported its members with online conferences on the economy, among other things. The aim was to accompany member companies through the Corona crisis. This has resulted in a new format: regular national and international Market Outlook Web Conferences.

The national pilot project is supported by the association's Economic Committee. The committee has organised online events on the economy to maintain contact with members and support them with information. Presentations on the current situation and perspectives as well as the presentation of current survey results of the association are the main components of this concept.

International Market Outlook Web Conferences

An example of the excellent European and international network in fluid power is the CETOP Market Outlook Web Conferences, which were created during the Corona period. The CETOP associations present online the current economic situation as well as the outlook for fluid power in their country. The country-specific information and presentations are available to members in the members' area of the CETOP website. Member companies can of course participate in the events. The International Fluid Power Summit Meeting, the meeting of the global fluid power community, was also held online in 2021 due to the Corona pandemic, a format that has been very popular with both associations and companies.

The Market Outlook Web Conferences will continue to be held regularly. Supplementary online surveys shortly before the events round off the current picture of the industry. This offers members the opportunity to obtain a compact picture of the national, European or global economic situation in fluid power at first hand, within a clearly limited and relatively short period of time.

Digitization / Fluid Power 4.0

Industrie 4.0 (IoT) is one of the capital topics for the industry

Digitized value chains require products and components that can reliably communicate with each other in a wide variety of applications; users expect the highest degree of interoperability. Therefore, the Fluid Power association, together with its member companies, has developed a standardization strategy for universal digital communication that implements a variety of activities at national and international level.

To enable data exchange, the physical fluid power product must be available digitally as a so-called digital twin. The central building block for implementing the digital twin is the asset administration shell. The digital twin enables compatibility at all levels of industrial automation, but also with interfaces and protocols such as OPC UA. It thus forms the digital link between product and user or between component and machine.

The basic precondition for digital production is a uniform definition of technical properties. In the last four years, relevant characteristics have been identified in more than 100 meetings at ECLASS, ISO and the VDMA and standardized with almost 60,000 corresponding change requests and entries. This standardization is a continuous process to ensure that German mechanical engineering, and in particular German fluid power, remains successful in the international competitive environment or can further expand both its know-how and its market position by means of digital value creation.

Digitization Fluid Power 4.0

Big Picture Industrie 4.0

The core of Industrie 4.0 is the beneficial networking of technical production goods and the interoperability between components, machines and systems.

Several VDMA initiatives, mosaic building blocks, are forming the picture of an interoperable system landscape of intelligently networked production Industrie 4.0. In many cases, drive technology companies are leading players in this.

The initiatives focus on:

- Connectivity – **how** data is transmitted
- Standardized interface – **which** information is transmitted
- Digital twin – **consolidation** of information

Connectivity: Wireless Transmission Technologies

Industrial-grade wireless connectivity makes it possible to exploit the potential of existing and new applications by relying on efficient, secure and flexible data transmission in machinery and plant engineering.

The VDMA working group Wireless Communications for Machines supports machine manufacturers in the integration of wireless systems in product and production and offers all know-how carriers an application-oriented network. In addition, we are the conceptual sponsor of the trade fair CMM – Connected mobile Machines & Mobility in Hanover/Germany.

Standardized Interface: OPC UA

The OPC UA interface standard is suitable for specifying data and information according to a consistent scheme. The aim is to define which information is transmitted, thus creating a world language of production and ensuring that the production systems involved also understand each other on a semantic level.

Our OPC UA activities and the dissemination through the „umati“ brand and community have been a strategic pillar for the VDMA for years.

Digital Twin: IDTA

The industrial digital twin aims at continuous data availability along the life cycle of a component, machine or plant – from product planning through development, production, commissioning and use to recycling. This creates the conditions for new value creation networks across company boundaries.

The Industrial Digital Twin Association (IDTA) is the central point of contact for the digital twin – an alliance of active designers co-initiated by the VDMA, who make the digital twin practically usable for industry through open technologies.

Research and Innovation

The Fluid Power Research Fund and the ‚VDMA-IMA' funding group take up industry-related topics in the pre-competitive area and carry them out with research institutes and industry working groups that accompany projects.

Fluid Power Research Fund

Digitization, networking, communication of components and systems, energy efficiency, carbon footprints, alternative fluids, additive manufacturing, modularisation and, finally, the resource-efficient use of materials are the challenges facing fluid power. The increasing requirements and legal initiatives, e. g. on materials, meet criteria such as shortened development and product life cycles. In addition, the industry is in daily competition with competing drive technologies. This requires a high speed of innovation.

Since 1974, the Fluid Power Research Fund with its approximately 50 member companies has been addressing relevant industry topics in the pre-competitive area and carrying out corresponding research projects with research institutes and industry project-accompanying working groups. Current developments are presented annually at the **members' assembly** and the public information event. Our homepage also provides a constantly updated **overview of current projects** (as of Sept. 2021: 16 projects).

The common goal is to support the high innovation dynamics in hydraulics and pneumatics and to maintain the position of German fluid power as a technological world market leader. This cooperation gives not only large, but also small and medium-sized companies the opportunity to participate in the latest findings and research results with a manageable financial investment.

Scientific research also promotes the academic training of qualified workers. Today's students are the urgently needed skilled workers of tomorrow. The commitment to the research fund is therefore a real investment in the future.

Joint Research Fluid Power Research Fund

Members' Meeting Fluid Power Research Fund 2021

Funding Group VDMA-IMA

Usually, attention is paid to seals only if they fail. Consequently, they are barely present in public perception and, moreover, are treated quite stepmotherly in research funding. An analogous situation is prevalent at universities: well-recognized research centers have ceased their research activities, and professors, well-known experts in their field, retired without a successor.

A funding group for the “non-profit expansion of knowledge in sealing technology” has been established at the University of Stuttgart (started in 2006). Its goal is to maintain knowledge at the universities and to support sealing technology related research and education. The funding group consists of almost 20 sponsors and mainly supports the Institute of Machine Elements (IMA) at the University of Stuttgart.

Twice a year, the associated project group meets at the research institute for exclusive lectures and discussions. The resulting bilateral cooperation, free seminar participation, activities for pre-competitive joint research, and the orientation of research and teaching are equally beneficial for both the institute and the funding companies.

Funding Group VDMA-IMA

European Directives and Regulations

We lobby in legislative procedures for practical regulations in the interest of the fluid power industry. We interpret European directives and regulations and support our members in their application. Examples of this are: Machinery Directive, Pressure Equipment Directive and the Regulation on chemicals REACH.

Hard Chrome Plating – Chromium(VI)

Electroplating plants need chromium trioxide (chromium(VI)) to coat piston rods with hard chrome. According to REACH, chromium(VI) may only be used for authorised uses in the EU.

In the authorisation process, the Fluid Power association, together with the VDMA department „Technology, Environment and Sustainability“ and other associations, has lobbied for chromium(VI) to continue to be used in the EU, for example for hard chrome plating of piston rods.

The EU Commission approved the application for use of chromium(VI) submitted by the CTAC consortium (consisting of the leading chemical companies and electroplating plants) in December 2020 after intensive examination and several years of delay. Thus, a long-awaited and important milestone for more planning and legal certainty was reached.

The EU Commission has set a monitoring period of seven years from the „sunset date“ (21 September 2017) for hard chromium plating. **Authorisations** will thus expire on 21 September 2024, unless a corresponding follow-up application has been submitted by 21 March 2023. The CTAC consortium is already working on this.

Restriction of the Use of Lead as an Alloying Element

Currently, many member companies of the Fluid Power association benefit from RoHS* exemptions, especially for lead as an alloying element in steel, aluminium and copper. The exemptions expire for various product categories as early as 2021. An industry consortium („Umbrella Project“) has applied for a continuation of the RoHS exemptions.

The VDMA was involved in the preparatory work, which the Fluid Power association supported with statements on practical aspects.

A decision has not yet been made. Until then, the exemptions will continue to apply. In the event of a negative decision, a transitional period is also provided for.

Chromium (VI) Authorisations

* RoHS: EU Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment.


ENERGY RECOVERY

Standardization Activities

Standards serve to open markets and can have a decisive influence on them. The Fluid Power association is therefore intensively involved in the interests of its members in a large number of standardization committees at the national (DIN), European (CEN), and international (ISO) level. The focus is on representing interests in international standardization.

The Fluid Power association also publishes **VDMA Specifications** on relevant standardization topics, which may subsequently be submitted as ISO project proposals. Examples of this are the VDMA-Specification on the energy efficiency of hydraulic and pneumatic systems.

Increasing Energy Efficiency in Fluid Power

The VDMA Specifications 24580 and 24581 (Application notes for optimising the energy efficiency of hydraulic and pneumatic systems, respectively) served as a template for the technical reports ISO/TR 22164:2020 and ISO/TR 22165:2018.

In ISO/TR 22164, the ISO working group „Hydraulic systems“ restructured the content of the VDMA Specification 24580 applicable to stationary applications and extended it to mobile hydraulics. In contrast, the ISO working group responsible for pneumatics has adopted VDMA Specification 24581 almost unchanged in ISO/TR 22165.

As a result, Germany has initiated a standardization project in which a procedure for the design of energy-efficient hydraulic systems is to be described. The preliminary work for this demanding and complex project is underway under German leadership at both the national and international level.

Despite different national preferences on energy efficiency standards, the pneumatics experts have the common goal of developing good, understandable, and implementable standards for the industry in order to keep the technology successful and attractive.

Germany, France, and Japan presented their approaches. It became apparent that all proposals have their specific strengths and areas of application. It, therefore, makes sense to develop three independent standards, each with its own project management but close links and references.

The three countries are preparing drafts for the different approaches and will discuss them.

ISO 5598 – The Vocabulary Standard for Fluid Power

The vocabulary standard ISO 5598:2020 contains German in addition to the official ISO languages English and French. Compared to the 2008 version, the fluid power experts have updated and included a large number of terms in line with the current state of the art.

Standardization Committees

VDMA Specifications

113 DIN-Meetings 10/2017 – 10/2021

121 ISO-Meetings 10/2017 – 10/2021

91 ECLASS-Meetings 10/2017 – 10/2021

The Technical Committee ISO/TC 131 „Fluid power systems“ aims to continuously adapt the standard. Preparations for the next edition are already underway.

Realistic Estimation of the B_{10D} Reliability Value

In safety-related parts of control systems, pneumatic components are also used for which a B_{10D} value is required. This indicates how many switching cycles can be carried out before statistically 10 percent of the components are expected to fail dangerously. Until now, it was determined from the B_{10} value using a rule of thumb. Alternatively, a conservative standard value was used.

The VDMA Specification 24578:2014-06 describes an approach for directly determining the B_{10D} value. Finally, in 2019, ISO published the Amendment ISO 19973-2:2015/Amd 1:2019 to ISO 19973-2, ’Pneumatic fluid power – Assessment of component reliability by testing – Part 2: Directional control valves‘, in which the German approach was adopted.

The resulting changes result in more realistic, sometimes significantly higher B_{10D} values, which is associated with considerable advantages for the design and use in the affected control systems.

Shifting Time Standard ISO 12238

ISO 12238 ’Pneumatic fluid power – Directional control valves – Measurement of shifting time‘ is relevant for machine safety. In October 2019, the responsible working group initiated a project to revise ISO 12238 under German leadership. The standard will be expanded so that the characteristic values determined with it can also be used for safety functions.

Essential changes concern:

- the extension of the standard to monostable and bistable valves with two of three shifting position functions,
- the addition of requirements for testing when the valve is shifted to the venting position,
- establishing consistency with other standards, such as the ISO 6358 series of standards, and
- updating the test equipment and test procedures to reflect the state of the art.

Standardization Fluid Power

Events and Trade Fairs

The association offers various events for intensive exchange – from high-level congresses to numerous trade fair and exhibition activities in Germany and around the world.

Events and Congresses

Events such as the Fluid Power Info Day „Technology and Standardization", the Fluid Power Research Fund Info Event and Management Summits are organised exclusively for member companies.

The management meetings in China and India are of particular interest to the worldwide subsidiaries of our members. In addition, the association organises the International Fluid Power Summit Meeting via the European industry association CETOP.

The association also supports or organises:

- International Fluid Power Colloquium (IFK) with ifas, Aachen/Germany
- International Sealing Conference (ISC) with IMA, Stuttgart/Germany
- Colloquium on Mobile Hydraulics at KIT, Karlsruhe/Germany
- Conference on Hybrid and Energy-Efficient Drives for Mobile Machinery at KIT, Karlsruhe/Germany
- Congress Predictive Maintenance (until 2019)

Trade Fairs

The VDMA supports its member companies in their sales activities worldwide. It shapes the global trade fair landscape as the conceptual sponsor of leading trade fairs and organises joint stands, forums and special shows..

Joint stands in Germany

The joint stands organised by the Fluid Power association together with the Power Transmission association and VDMA Services GmbH offer member companies the exclusive opportunity to present themselves prominently and cost-effectively at domestic trade fairs, such as HANNOVER MESSE, AGRITECHNICA Systems & Components and bauma, with an all-round carefree package.

German Pavilions Abroad

The foreign trade fair programme is an important module of export promotion by the Federal Ministry for Economic Affairs and Energy. To open foreign markets, the VDMA submitted annual applications for funding for German Pavilions, and the Fluid Power association specifically for trade fairs in China, Turkey and the USA. Up until the outbreak of the pandemic, all of them were successfully carried out, in China also still on site in autumn 2020 and 2021.

Forums

The association organises forums on trend topics relating to fluid power at domestic and foreign trade fairs. Predictive maintenance, smart manufacturing and topics on intelligent fluid power (Industrie 4.0, asset administration shell,

115 Onsite Events 2018 – 2021

170 Webmeetings 2018 – 2021

interoperability) have been high on the agenda at HANNOVER MESSE in Germany and PTC ASIA in Shanghai over the last four years.

Special Shows

A highlight at HANNOVER MESSE (Hanover Fair) were the special shows „Predictive Maintenance“ and „Intelligent Power Transmission Engineering and Fluid Power“ initiated by the association. The association also supported the accompanying guided tours.

Public Relations

The association’s public relations activities are an essential part of information exchange process, serving a wide variety of channels. The following has been published over the last four years:

- Brochure “Fluid Power 4.0 – digitize, connect, communicate”
- Brochure “VDMA Fluid Power – The Industry Network”
- Digital Fluid Power newsletter
- CETOP Directory
- Digital “Weekly CETOP News” on cetop.org
- Country-specific newsletters

OneVDMA Platform

The VDMA‘s new platform has been live since the end of March 2021. Behind the new appearance at the familiar address **vdma.org** lies much more than a simple website. Numerous innovations make it possible for our members to access VDMA offers and services in different ways in the future and to collaborate more digitally with each other as well as with the people in the VDMA – hence we speak of the OneVDMA platform. Via a personal login and personal profiling, the information relevant to the user can be filtered out of the huge pool of information – but it is also possible to think outside the box and discover what further information and support the VDMA has in store for its members.

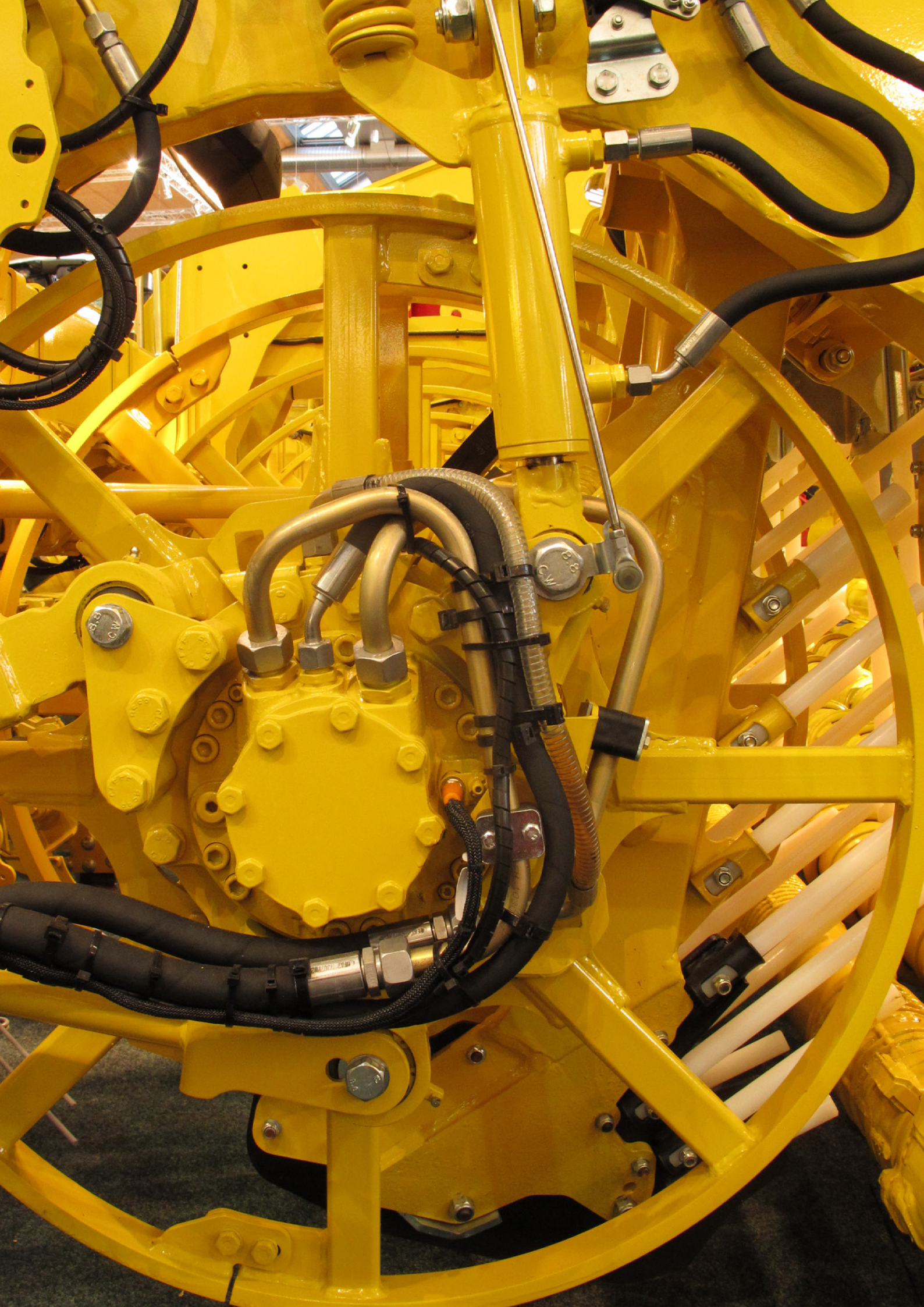
Events and Trade Fairs
One VDMA Platform

Further Information

Further up-to-date information is always available on the new web platform of the VDMA and Fluid Power. You can subscribe to selected topics via a personal login and thus keep up to date continuously, tailored to your interests.

- Over **200 member companies** of the Fluid Power association can be found in our online directory.
- As a member of the association, you can request a wide range of **national and international market information**. Such meaningful and up-to-date data for fluid power is not available from any other source.
- Find out about the **DIN and ISO standardization committees** and standards in the Fluid Power association.
- With the VDMA newsletters we inform you about current trends, news and events from the VDMA and the world of mechanical and plant engineering – you decide which specific newsletters we send you.

VDMA Fluid Power
Members Fluid Power
National Market Information
International Market Information
DIN and ISO Standardization Committees



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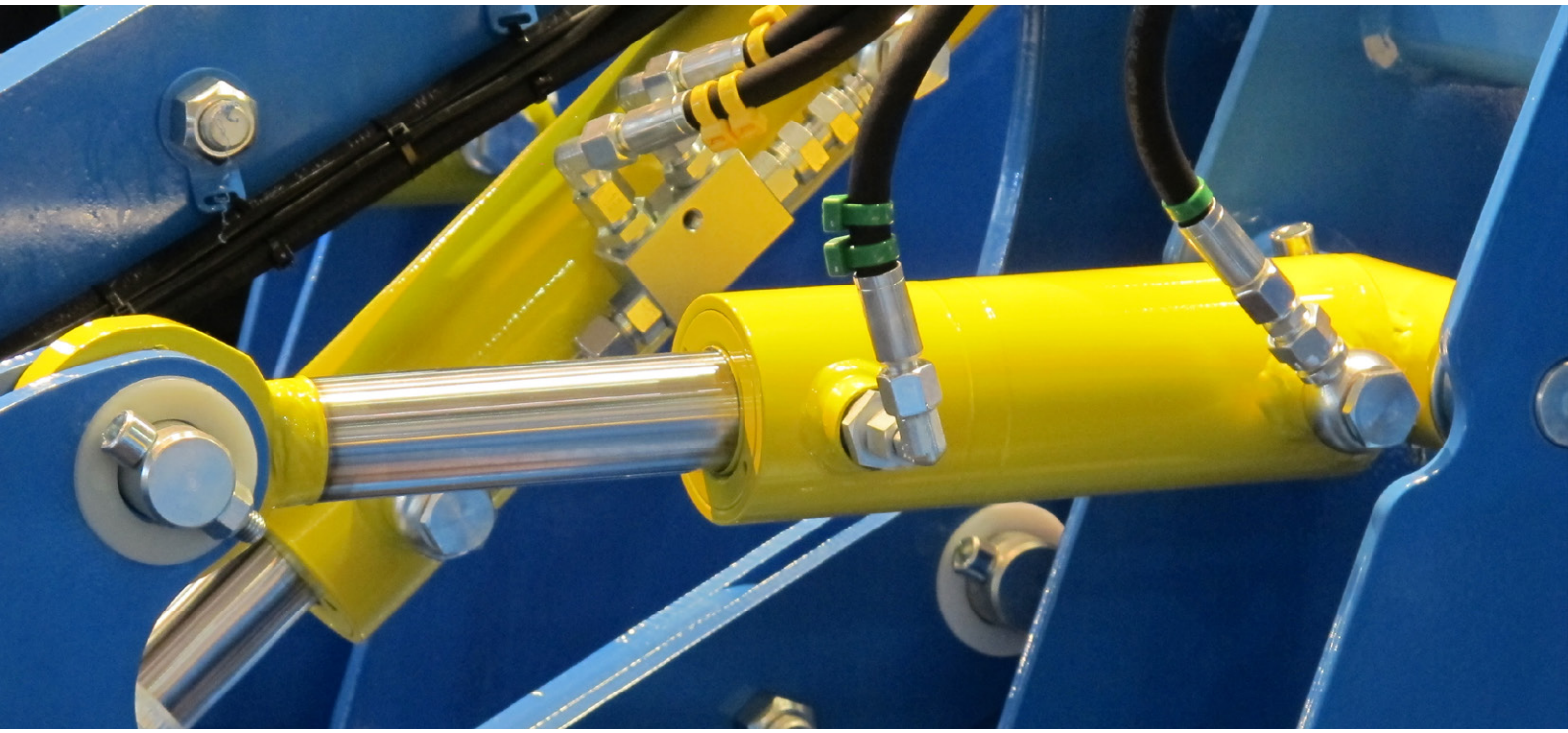

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