



CKBA Russia – Researching success

Russia needs no introduction as one of the world's largest suppliers of gas. Underpinning this position is a large, active and up-to-date valve industry. As a matter of fact, Russia has one of the most enterprising valve sectors in the world. Being a long-standing part of the Russian valve business, CKBA Russia has a vast range of experiences, services and products to offer its customers. Valve World spoke to CKBA Russia's General Director Mr Vladimir Dydychkin about the company's interesting history, current status and plans for the near future.

By Christian Borrmann

A bit of history

"The Central Valve Design Bureau (CKBA) was established in 1945 based on the Planning and Design office founded in 1931," tells Mr Dydychkin when asked about the beginnings of CKBA Russia. "At that time, it was defined as the leading valve research, development and design centre in Russia and in the following years until 1994, CKBA was responsible for national standardization in industrial pipeline valves as well as for R&D pertaining to new valve types." During all these years, the company's work scope covered various valve sections such as control and safety valves for sour service to fit oil and gas fields, with a special focus on hydrogen sulphide and carbonic acid (gas) concentration up to 25%. Mr Dydychkin: "We quickly expanded our activity to develop valves for chemical – including nitrogen fertilizer production – refinery, and food industries,

as well as valves for municipal utilities (for heating and water supply systems, gas distribution systems), gate valves with large DN's and high pressures for oil-trunk pipelines. CKBA was the pioneer in developing the design specifications for factory repair of valves for oil-trunk pipelines and general specifications for factory repair of general purpose industrial valves."

In 1994, the company underwent a major reorganization following changing market requirements. "Our earlier role was of importance as an experimental design organization assuring valve designs for new projects and developing valve manufacture for different valve suppliers. Then, after the break-up of the USSR, the valve manufacturers began to develop and manufacture new valve types themselves. We had to find a new market niche within the valve industry and that became engineering. This is reflected in



the new full name which is Scientific and Production Firm 'Central Valve Design Bureau', Joint Stock Company (NPF CKBA, JSC)."

The new role

Asked how he would describe CKBA Russia's new role within the Russian valve industry, Mr Dydychkin answers openly: "Currently, NPF CKBA, JSC carries out the integral cycle from the research activities, standardization, valve research and development and industrial engineering to complete delivery of science-intensive valves to the customer on turnkey terms and assuring servicing of delivered systems within the whole service life. Eighty per cent of our business relates to the finished item." And he goes even more into detail: "Let's face it: the customer doesn't want to know who designed the valve or how it was developed or that it was all bought



Mr Vladimir Dydychkin, General Director of CKBA Russia.

in. Ordered in, ready manufactured equipment is rather complex, it must comply with the given requirements and it is impossible to buy it on the 'mass' market for good reason. Moreover, this equipment is such that it needs serious scientific design and engineering maintenance. Our product is equipment that meets all the requirements of our customers to realize their projects." In order to keep itself at the top of the game, CKBA is based in the heartland of Russian scientific endeavour. Upon receipt from the project manager, initial requirements are analyzed and hydraulic, strength and stress calculations performed. CKBA then further assesses the reliability, safety, and structural materials and where appropriate arranges

for extra research from leading Russian institutes. This thorough approach pays dividends, comments Mr Dydychkin: "the result is an optimally-tailored product, ensuring that the customer receives exactly what he or she needs."

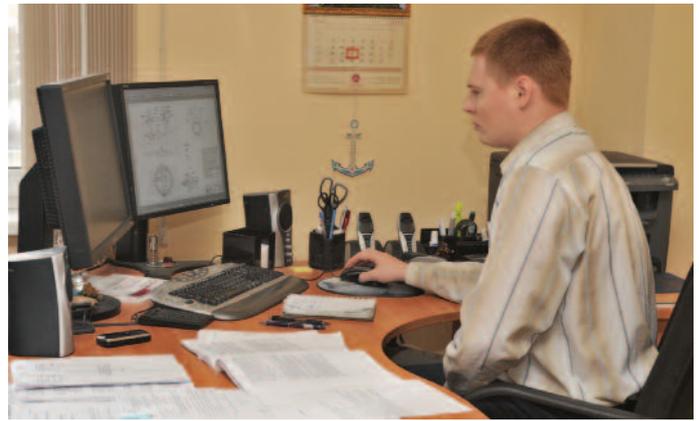
Standards harmony

Next to its engineering services, CKBA also plays a big part within standardization. The company is leading the Federal Agency of Regulation and Metrology, also called Rostekhnregulirovanie, which represents the national standardization body in ISO/TC153. Mr Dydychkin: "All national state valve standards (GOST and GOST R, a total over 50 standards) were developed at CKBA. In addition to this, there are over 200 so-called valve industry normative standards, that comprise groups relating to metal materials, calculations (strength and stress, hydraulic, thermal, resistance against environmental effects), tests, actuators, as well as to routine processing (heat treatment, weld, surfacing, coatings, preservation). The overwhelming majority of Russian valve manufacturers as well as CIS plants use CKBA standards as the most up-to-date, proven and time-tested documents."

But the company is not only developing or reviewing their actual standards, they also examine all other known worldwide standards, especially ISO, EN, API, IEC, ANSI, ASME and NACE. "The reason for



Examination of industrial safety of valves.



Mr Dydychkin: "The planning of projects belongs certainly to our core activities."

this is that we try to achieve something which is called 'standards harmony,'" says Mr Dydychkin and he goes on explaining CKBA's motives. "The main document pertaining to valve safety in the EC is Directive EC97/23 (PED). Our experts consider the provisions of this Directive to be insufficient to assess valve safety. As it is widely known, industrial valves must not only be strong, but also functional and operable, have seat tightness, reliable operation with specified fluids at prescribed ambient conditions. Safety valves must respond when the pressure in the vessel or pipeline exceeds the adjusted values, shut-off or isolating valves must be closed within the minimum set out time. And this list is far from complete, requirements being necessary to meet during the whole service life of the valve including design development, manufacture, operation, repair, shipping and recycling."

According to Mr Dydychkin, papers on the necessity of special EC Valve Safety Directive approval were proposed to CEIR Congress, St Petersburg, 2007 and to the Valve World Conference in Maastricht, 2008. "These papers aroused quite a lot interest and the development of the special EN standard regarding general requirements to valve safety was recommended. Our national state standard (GOST R) is now under review by Russian plants and the proposed date of its approval is 2009. This standard may be approved as the basis of the appropriate ISO and EN standards. Such standards would facilitate the setting of integrated, universal requirements to valve safety, highlighting specific properties and requiring the individual approach of reliability and safety assurance. They

would make a valuable contribution to the total safety guarantee of technological systems and reduce the risk of anthropogenic accidents and disasters." In order to demonstrate the differences and similarities in valve standardization, CKBA has conducted an overall comparative analysis of valve requirements set out in Russian and American standards. This analysis comprises four main themes: control scope of metal blanks for the basic parts and fasteners; non-destructive test methods and flaw rates – ultrasonic tests, dye penetrant and magnetic particle flaw detection of forgings, dies, castings and weld seams and surfacing; calculation

procedures, principles of strength rating, allowable stresses; and finally requirements to valve tests, including test pressure, temperature and holding time.

Mr Dydychkin explains the results as follows: "the conclusion we reached is that the Russian regularity documents (codes of supervisory bodies, GOST, GOST R, CKBA standards, etc) are generally speaking equivalent to USA standards. We also noted that in some cases, especially with regard to inspection scope, non-destructive testing, calculation rates of cyclic and seismic strength assessment, and emergency modes, Russian standards rates are in fact considerably more stringent."



A gate valve DN 800 for the ESPO project

Current research trends

A key feature of CKBA is its proven strength with regards to R&D. The company is very active in current research trends such as valve reliability and safety indices, whereby it considers a wide scope of topics such as materials, hydraulics, thermal properties and seismic behaviour. It also develops valve assemblies and parts such as seats, bellows, gland sealing, threaded pairs, gasket seals, etc. The main goal of all these departments is to carry out applied research engineering, whereby it also works closely with external problem-oriented research institutes and labs specializing in the appropriate areas. Mr Dydychkin: "Currently, we co-operate with more than 25 institutes and laboratories. As a rule, research work is carried out in compliance with mutually co-ordinated programmes. These programmes entail amongst others material technology and basic valve assemblies and parts development." Mr

Company Facts

Name:	CKBA Russia
Founded:	1945
General Director:	Vladimir Dydychkin
Headquarters:	St. Petersburg, Russia
Key markets:	Oil and gas, special shipbuilding, nuclear power industry, offshore oil and gas production

Dydychkin was quick to give some examples from the materials programme. "Firstly, work is underway with alloyed steels with a lower nickel content and special coatings. These steels are being considered instead of special high-alloy steels and alloys for valves operating with seawater and sour fluids. Secondly we are reviewing the selection and certification of cast carbon steel which meets the requirements of AK Transneft to valves for trunk oil pipelines. Also, we are looking at the commercial development of new low-carbon steels melting by gaseous oxygen refining and finally we are studying the usage of potentials of centrifugal electroslag castings in the valve industry." CKBA is also pursuing some very interesting valve programmes. One topic for example is the development of

ceramic plunger pairs to increase the service life of throttling valves for gas field systems. Another research field is the use of special coatings to protect bellows assemblies and springs in stop and safety valves for use with chlorine (wet and dry), sour gas and other highly corrosive fluids.

Future research plans

Not content with its existing heavy R&D workload, CKBA is already planning extensive new research activities. For example, one programme on materials property modification will focus on the potential of using pulse electron beams to harden the surfaces of valve parts. A second materials programme will investigate modifications on the basis of NANO technology.

In addition to these new research programmes, the company is also involved in the R&D of diagnostics and hydraulics which, according to Mr Dydychkin, is another important aspect of CKBA's scope of work. "We expect a lot from the development of experimental diagnostic systems for motor-actuated valves installed on nuclear power plants and on trunk oil pipelines, as well as from the development of a local diagnostic system for bellows used in nuclear and marine valves. Major works have been outlined and are now carried out pertaining to the reliability and safety assurance of valves used in hazardous industrial systems and to improvements in valve reliability and durability. I think that one of the leading themes of this trend will be the development of a control system for required reliability indices assurance during valve manufacture. Our long-term R&D plans, up to 2011, specify over 50 topics relating to all lines of development. So we can say with some certainty that science is extensively applied in the valve industry and its further development and application will be one of the indispensable conditions in CKBA's successful entry to the international valve market."

Project reference list

Following a major reorganization in 1994, CKBA now provides a whole range of standardization, research, development and engineering services to the Russian valve sector. The following sample projects are indicative of the company's vast capabilities:

- delivery of steam valve block for Rostovskaya NPP-2
- delivery of high pressure and temperature valves (gate valves, stop valves) for Beloyarskaya, Novovoronezhskaya, Leningradskaya NPPs
- design maintenance, all calculations (including hydraulic, strength and seismic) of delivered gate valves DN 1200 within the bounds of ESPO project (East Siberia – Pacific Ocean)
- development, launching the production, and delivery of all industrial valve spectrums for specific systems (oil, gas, ballast and sea water, pneumatic transport of barite etc.) of Sea Sleetproof Platforms
- delivery of axial flow valves DN 150 – 800 for the oil & gas industry
- production development of safety valves DN 150 – 200 for oil
- delivery of a full range of valves for seawater (including valves made of titanium alloys). Valves delivering benefits both in the conditions of the Indian Ocean seawater and of the Northern offshore area
- valve delivery for chemically hazardous and aggressive fluids (chlorine, ammonia and so on)
- valve delivery for venting systems (including special ones) DN 150 – 1600



Visual inspection of valves