



XVI International Scientific and Technical Conference on Compressor Manufacturing

September 23-25, 2014

September 23	
08:30-09:45	Registration of the participants
10:00-12:00	Words of welcome Plenary meeting
12:00-12:30	Coffee-break
12:30-14:30	Tour on the production sites of the Nevsky Zavod
14:30 – 15:30	Lunch
15:45-18:00	Continuation of the plenary meeting
September 24	
10:00 -12:00	Sections work
12:00-12:30	Coffee-break
12:30-14:30	Sections work
14:30-15:30	Lunch
15:45-18:00	Sections work
19:00-22:00	Evening event for the conference delegates
September 25	
10:00	Sections work
12:00-12:30	Coffee-break
12:30-14:30	Sections work
14:30-15:30	Lunch
15:45-18:00	Sections work, ASCOMP meeting
18:00-18:30	Summary of the Conference

The Working Program of the Conference

September 23	
08:30-09:45	Registration of the participants
10:00-12:00	<p>Welcome address of Igor Starinkov, President of CJSC “REP Holding”.</p> <p>Welcome address of Yuriy Galerkin (Eng. Sc. D.), Chairman of Association of Specialists in Compressors and Pneumatics (ASCOMP)</p> <p>Welcome address of representatives of the Committee for industrial policy and innovation of St. Petersburg</p> <p>Plenary meeting</p> <ul style="list-style-type: none"> ● OJSC “Gazprom” <p>Modern gas compressor equipment - the result of joint work by the manufacturer and consumer</p> <ul style="list-style-type: none"> ● CJSC “REP Holding” <p>Package supplies of power equipment by CJSC “REPH”</p> <ul style="list-style-type: none"> ● Scientific and Production Association “ISKRA” <p>The experience of Scientific and Production Association “ISKRA” in creation of gas-pumping units</p>
12:00-12:30	Coffee-break
12:30-14:30	Tour on the production sites of Nevsky Zavod
14:30 – 15:30	Lunch
15:45 – 18:00	<p>Continuation of the plenary meeting</p> <ul style="list-style-type: none"> ● LLC “Gazprom transgaz Ukhta” <p>Areas of concern for operation of compressor</p>

	<p>equipment at LLC “Gazprom transgaz Ukhta”</p> <ul style="list-style-type: none"> • “Mitsubishi Heavy Industries Compressor Corporation” <p>The development of a new generation high-efficiency compressor for gas-pumping units</p> <ul style="list-style-type: none"> • PJSC “NII turbokompressor n.a. V.B. Shnepp” (HMS Group) <p>Experience of JSC “Kazancompressormash” (HMS Group) in delivery of compressor plants and GTU for the recovery of oil-associated gas in full shop availability</p> <ul style="list-style-type: none"> • Solar Turbines <p>Availability and Reliability Compressor Sets of the Natural Gas Trunk Pipelines using method Monte Carlo</p> <ul style="list-style-type: none"> • SSS Gears LTd/AZG Consulting GmbH <p>Up-to-date compressors: optimal arrangement, maximum efficiency</p>
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September 24

<p>10:00 -12:00</p>	<p>Sections work</p> <p>Room 1 Section 1</p> <p>Reciprocating and rotary compressors</p> <p>Moderator: Boris Chrustalev (Eng. Sc. D.), Prof. of Compressor, Vacuum and Refrigerating Equipment Department, St. Petersburg Polytechnic University</p> <p>Reports:</p> <ul style="list-style-type: none"> • Thomas Heumesser (Leobersdorfer Maschinenfabrik GmbH & Co.KG) “Application of API 618 and API 11P standards in the oil-and-gas industry.
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Analysis of possible deviations from the API standard in the design of high pressure reciprocating compressors to optimize production costs and reduce the cost of the equipment”

- V.L. Yusha, V.I. Karagusov, S.S. Busarov (Omsk State Technical University) “Theoretical analysis of existing methods to simulate operational processes in relation to low-speed long-stroke stages of reciprocating compressors”.
- A.A. Kotlov, A.F. Rekstin, B.S. Khrustalev, I.V. Khrustaleva (St. Petersburg Polytechnical University) “Positive displacement compressors for geological exploration”.

Room 2 Section 2

Centrifugal and axial compressors

Moderator: Yuriy Galerkin, (Eng. Sc. D.),
Chairman of Association of Specialists in
Compressors and Pneumatics (ASCOMP)

Reports:

- V.K. Yun, A.S. Reider (CJSC “REP Holding”) “Unified centrifugal compressors for OJSC “Gazprom”
- A. N. Lyubimov, V.E. Evdokimov, A.I. Reprinzev, A.V. Semakov (LLC Scientific and Production Company “Entechmash”) “On the use of experimental methods and calculation in the design of flow parts of centrifugal compressors”.
- Yu.B. Galerkin, A.A. Drozdov, O.A. Solovyova (St. Petersburg Polytechnic University) “Specific features of vaneless diffuser operation in the centrifugal

	<p>compressor stages with varying meridian shape”</p> <p>Room 3 Section 3</p> <p>Gas-pumping units and sets</p> <p>Moderator: Vladimir Parafeynik (Eng. Sc. D.), leading researcher of PJSC “Sumy Frunze NPO”</p> <p>Reports:</p> <ul style="list-style-type: none"> • V.Z. Minlikaev, A.V. Skoryk, A.V. Semushkin, S.S. Mikheev (OJSC “Gazprom”, LLC “Gazprom VNIIGAZ”) “Application of the new type compressor equipment for construction of a booster gas field complex and reconstruction of existing facilities at OJSC “Gazprom” fields. • O.V. Zorkina (CJSC “REP Holding”) “Unification of the GPA modular equipment on the basis of heavy-duty GTU rated at 16, 22, 32 MW”. • O.V. Kryukov (OJSC “Giprogazcentr”) “Energy-saving technology of variable-frequency electric gas-pumping units”. • V.P. Parafejnik, R.A. Lazorenko, S.A.Prilipko (PJSC “Sumy Frunze NPO”), V.A. Rogachev, A.V. Semenyako (National Technical University of Ukraine) “Analysis of the ACHE effectiveness as a product and an element of the hydrocarbon gas compression energotechnological system”
12:00-12:30	Coffee-break
12:30-14:30	<p>Sections work</p> <p>Room 1 Section 1</p> <p>Reciprocating and rotary compressors</p>

Moderator: Boris Chrustalev (Eng. Sc. D.), Prof. of Compressor, Vacuum and Refrigerating Equipment Department, St. Petersburg Polytechnic University

Reports:

- A.A. Kotlov, O.Yu. Ustyushenkova, N.S. Fomushkin, B.S. Khrustalev, I.V. Khrustaleva (St. Petersburg Polytechnic University) “Work of the reciprocating compressor compressing various gases”
- V.L. Yusha, G.I. Chernov (Omsk State Technical University) “Theoretical estimate of a possibility to increase the effectiveness of mobile compressor plants by pre-cooling the compressed gas and obtaining more power due to rejected heat recovery”
- A.S. Boryak (LLC “TRIZ”) “Experience of LLC “TRIZ” in the modernization of reciprocating compressors for the chemical industry”
- A.A. Kotlov (St. Petersburg Polytechnic University) “The CAD concept for reciprocating compressors”

Room 2 Section 2

Centrifugal and axial compressors

Moderator: Yuriy Galerkin (Eng. Sc. D.), Chairman of Association of Specialists in Compressors and Pneumatics (ASCOMP)

Reports:

- R.F. Murtazin, V.A. Futin, I.M. Shubkin (PJSC “NII turbokompressor n.a. V.B. Shnepp”, HMS Group) “Increasing of compressor performance because of

studying the fluid flow in a half-open impeller when making a new flowing part”

- Yu.B. Galerkin, L.N. Marenina (St. Petersburg Polytechnic University) “Research and improvement of centrifugal stage stator elements using methods of computational fluid dynamics”
- I.V. Yurko (LLC “TRIZ”) “The design and optimization methods for inlet variable vanes of the general-purpose air centrifugal compressors”
- L.K. Chernyavsky, E.M. Onatskaya (CJSC Scientific and Production Company “Nevintermash”) “Computational and theoretical optimization of the circle return bend of a centrifugal stage”

Room 3 Section 3

Gas-pumping units and sets

Moderator: Vladimir Parafeynik (Eng. Sc. D.), leading researcher of PJSC “Sumy Frunze NPO”

Reports:

- O.E. Vasin (OAO “NOVATEK”) “Gas compressor units of new generation for the booster compressor stations”
- O.V. Kryukov, A.S. Hlynin (OJSC “Gyprogaztsentr”) “Techno-economic aspects of application of the electrically-driven gas-pumping units at gas trunk-line compressor stations”
- A.V. Yakovlev (CJSC “REP Holding”) “High-speed variable electric drive for compressors”
- A.D.Vanyashov, A.V. Zherelevich, V.V. Karabanova (OJSC “Sibneftetransproekt”, Omsk State Technical University) “The rationale for selection of gas-pumping units of a specified power at the stage of

	<p>the compressor station reconstruction project”</p> <ul style="list-style-type: none"> • V.I. Yurko (LLC “TRIZ”) "Energy – saving upgrading of the gas transmission system gas-pumping units”
14:30-15:30	Lunch
15:45-18:00	<p>Sections work</p> <p>Room 1 Section 4</p> <p>Compressors for refrigerating and cryogenic machines</p> <p>Moderator: Igor Sukhomlinov (Eng. Sc. D.), Chief researcher of OJSC “VNIIHolodmash-holding”</p> <p>Reports:</p> <ul style="list-style-type: none"> • V.L. Yusha, V.I. Karagusov (Omsk State Technical University) “Solar concentrators for a thermoacoustic compressor” • I. Ya. Sukhomlinov, M.V. Golovin (OJSC "VNIIHolodmash-holding") “Sealed refrigerant centrifugal compressor on gas dynamic bearings” • Ye.A. Kondratyeva, V.V. Sergeev, A.M. Simonov (St. Petersburg Polytechnic University) “Characteristics of low and medium heat output thermal pumps with single-stage centrifugal compressors” • Ravikovich U.A., Ermilov U.I., Kholobzhev D.P. (Moscow Aviation Institute, MAI), I. Ya. Sukhomlinov, M.V. Golovin (OJSC “VNIIHolodmash-holding”) “The experience of refining the rotor system with leaf-type gas dynamic bearings for a refrigerant centrifugal compressor” • S.B. Pustovalov, I.M. Kalnin, V.A. Futin (NPF EKIP, Moscow State Engineering University, PJSC “NIIturbokompressor n.a. V.B. Shnepp”, HMS Group) “Single - shaft centrifugal compressor for a carbon

dioxide heat pump rated at 100 MW”

Room 2 Section 2

Centrifugal and axial compressors

Moderator: Yuriy Galerkin (Eng. Sc. D.),
Chairman of Association of Specialists in
Compressors and Pneumatics (ASCOMP)

Reports:

- A.D. Vaniashov, V.V. Karabanova, A.V. Grehnev (Omsk State Technical University, Omsk Engine – Building Design Office) “Review of the methods for calculating the characteristics of the turbocompressor IGV vane cascade”
- Yu.B Galerkin, A.F. Rekestin, A.V. Grigoryev, A.V. Solovyeva (Technical University of St. Petersburg, OJSC “Klimov”) "Issues related to the aerodynamic design of supersonic centrifugal compressor stages”
- L.G. Boyko, E.S. Barysheva, A.E. Demin, O.N. Drynov (National Aerospace University named after N. Ye. Zhukovsky (KhAI) “Study of centrifugal compressors for gas turbine engines”
- S.S. Evgenyev, A.V. Zubrinkin, V.A. Futin, I.M. Shubkin (PJSC “NII turbokompressor n.a. V.B. Shnepp”, HMS Group) “Influence of accuracy of the flow calculation in lateral backlashes between the impeller and the casing on the efficiency of a centrifugal compressor”

Room 3 Section 3

Gas-pumping units and sets

Moderator: Vladimir Parafeynik (Eng. Sc. D.),
leading researcher of PJSC “Sumy Frunze NPO”

Reports:

	<ul style="list-style-type: none"> • O.V. Kryukov (OJSC “Giprogazcentr”) “Diagnostics and prediction of the electric gas-pumping units technical condition” • A.D. Vaniashov, N. Yu. Filkin (Omsk State Technical University) “Study of strength, hydraulic and acoustic characteristics of the gas-pumping units piping” • F.G. Rossig (AZG Consulting) "Improved reliable engaging clutches for starters and barring gears of the gas turbine compressor sets” • N.K. Galantsev (CJSC “Multifilter”) “Embodiment of modern filter houses for gas-pumping units”
19:00 – 22:00	Evening event for the conference delegates
September 25	
10:00 – 12.00	<p>Sections work</p> <p>Room 1 Section 6</p> <p>Bearings and seals. Dynamics and strength. Upgrading.</p> <p>Moderator: Stanislav Yevgenyev (Eng. Sc. D.), Prof. of the Turbomachines Department, KGTU n.a. A.N. Tupolev.</p> <p>Reports:</p> <ul style="list-style-type: none"> • N.M. Ivanov, M.E. Chernin, A.Ye. Slitsky, T.O. Nazarikova (CJSC “REP Holding”), A.N. Ivanov (St. Petersburg Polytechnic University) “On ensuring the vibration reliability of centrifugal compressors” • A.A. Gubaidullin (S2M/SKF) “Unification of magnetic bearing systems for natural gas compressors” • V.A. Kulagin, L.V. Kashkina,

O.P.Stebeleva (Siberian Federal University) “Obtaining lubricants with improved tribological properties based on the cavitation technology”

- E.V. Rodin, Ye.A. Isayeva (“Scientific and Research Institute of Technology and Engine Production Setup”, FSUE “Scientific and Production Gas Turbine Building Center “Salyut” branch) “Analysis of the dynamic state of a ceramic sliding bearing as part of the aviation GTE speed increaser gear train”
- P.N. Grakovich, L.F. Ivanov, Shelestova V.A., S.F. Zhandarov, S.G. Danchenko, L.A. Kalinin (V.A. Belyi Metal Polymer Research Institute of National Academy of Sciences of Belarus (MPRI), A.V. Smirnov (PJSC “Sumy Frunze NPO”), I.A. Shkurskiy (JSC “Gazprom Transgaz Belarus”) “New fluoropolymer materials for compressor engineering”

Room 2 Section 2

Centrifugal and axial compressors

Moderator: Yuriy Galerkin (Eng. Sc. D.),
Chairman of Association of Specialists in
Compressors and Pneumatics (ASCOMP)

Reports:

- Yu.B. Galerkin, K.V. Soldatova, A.V. Grigoryev, A.V. Solovyeva (St. Petersburg Polytechnic University, OJSC “Klimov”) “Design analysis of the axial compressor supersonic stage impellers parameters”
- K.A. Danilov, Ye. A. Koroleva, V.Ye. Kuzmin, L.K Chernavsky (CJSC “Scientific and Production Firm “Nevintermash”) “Project for upgrading the k 1290-121-1 centrifugal compressor to improve the ammonia unit performance

up to 2100t per day”

- Yu.B. Galerkin, A.A. Drozdov, K.V. Soldatova (St. Petersburg Polytechnic University) “A new version of the mathematical model for calculation of centrifugal compressors gas dynamic characteristics”

Room 3 Section 7

Operation of compressor units. Diagnostics and monitoring of the compressor equipment

Moderator: Sergey Salnikov (Cand. Sc. In Engineering), Director of Gazprom VNIIGAZ Centre of compressor stations and energotechnological equipment

Reports:

- T.F. Kadyrov (LLC “Gazprom dobycha Yamburg”) "Experience of the compressor equipment operation at LLC “Gazprom dobycha Yamburg” facilities”
- V.Z. Minlikaev, A.A. Grebenyuk, S.Yu. Salnikov, A.V. Semushkin, S.S. Mikheev (OJSC “Gazprom”, LLC “Gazprom VNIIGAZ”) “Problems and prospects of implementing distributed compression when developing gas fields”
- S.A. Ivanov, M.G. Guralnik, O.V. Rizhenkova (CJSC “REP Holding”) “Operational damageability and extension of GPA blades service life”
- E.L. Selyanskaya, S.V. Kasyanov, A.M. Chusov, A.S. Goldobin, M.Yu. Karpin (Scientific and Production Association “Iskra”) “Issues related to testing centrifugal compressors”
- V.I. Sitas, A.V. Feduhin (Moscow representation office of “VOITH TURBO GMBH & CO. KG”) “Speed control of turbo- compressors by means of Voith

	hydraulic couplings”
12:00-12:30	Coffee-break
12:30-14:30	<p>Work sections</p> <p>Room 1 Section 6</p> <p>Bearings and seals. Dynamics and strength. Upgrading.</p> <p>Moderator: Stanislav Yevgenyev (Eng. Sc. D.), Prof. of the Turbomachines Department, KGTU n. a. A.N. Tupolev.</p> <p>Reports:</p> <ul style="list-style-type: none"> • M.Yu. Karpin, Ye.L. Selyanskaya, S.V. Kasyanov, A.S. Goldobin (OJSC Scientific and Production Association “Iskra”) "Influence of the DGS system on the centrifugal compressor performance” • A.V. Kudryavtsev, D.L. Titov (CJSC “REP Holding”) “Frequency converter for gearless high-speed electric drive of the gas compressor” • A.V. Cheplygin (Scientific and Production Association “Iskra”) “Laboratory facility for application tasks related to shaft train dynamics” • Kh. I. Muratov, S.Kh. Muratov, V.P. Sinenko, I.V. Oparin (LLC “Neva-Turbo”) “Modernization of compressor equipment with diaphragms jacking” • S.A. Pavliuk (JSC “Grace”) “Optimal solutions for DGS systems of turbo-compressor units with gas turbines” <p>Room 2 Section 2</p> <p>Centrifugal and axial compressors</p>

Moderator: Yuriy Galerkin (Eng. Sc. D.),
Chairman of Association of Specialists in
Compressors and Pneumatics (ASCOMP)

Reports:

- S.L. Shameko (OJSC “TurboRef”) “Methods of calculating gas dynamic characteristics when upgrading centrifugal compressors”
- Yu.B. Galerkin, O.A. Solovyeva (St. Petersburg Polytechnic University) “Improving the computation methods for gas dynamic characteristics of compressor centrifugal stages vaneless diffusers based on computational experiments”
- L.G. Boyko, A.Ye. Demin, Yu.F. Akhtemenko (National Aerospace University n.a. N.Ye. Zhukovsky (KhAI) “Multi-stage axial compressor regulation based on two-dimensional flow analysis”
- I.N. Tertyshny, V.P. Parafeynik, A.N. Nefedov, S.A. Rogalsky, N.A. Kotenko, D.N. Timoshadchenko, S.A. Mikhaylenko (PJSC “Sumy Frunze NPO”) “Thermodynamic analysis of centrifugal compressor performance as a complex power technological system of GPA-Ts-32P type unit”
- Yu.B. Galerkin, Yu.A. Popov, A.V. Grigoryev, A.V. Solovyeva, (St. Petersburg Polytechnical University, OJSC “Klimov”) “Computer program for calculation and primary design of axial compressor supersonic stages”

Room 3 Section 7

Operation of compressor units. Diagnostics and monitoring of the compressor equipment

Moderator: Sergey Salnikov (Cand. Sc. In Engineering), Director of Gazprom VNIIGAZ Centre of compressor stations and

	<p>energotechnological equipment</p> <p>Reports:</p> <ul style="list-style-type: none"> ● N.S. Sinitsyn, E.A. Chernikova, V.A. Shchurovsky (OJSC “Gazprom VNIIGAS”) “On unification of programs and procedures for acceptance tests of gas compressors applied at OJSC “Gazprom” facilities” ● V.P. Parafeynik, S.A. Prilipko (PJSC “Sumy Frunze NPO”) “Methods of thermodynamic performance analysis of modular turbo-compressor packages” ● V.L. Yusha, A.V. Grehnev, A.D. Vanyashov (Omsk State Technical University, Omsk Engine Design Bureau) “Determination of functional relationship between the elements of the turbo-supercharger governing system for specified operating conditions of a power plant” ● V.B. Shatrov, M.I. Sokolovsky, Y.P. Eryshkin, Ye.L. Selyanskaya, S.V. Kasyanov (OJSC Scientific and Production Association “Iskra”) “Compressor equipment of the "Ural" series for booster complex facilities” ● A. N. Balyakin (Howden Ltd.) “Advanced technologies and experience of Howden Ltd. in selection and maintenance of compressor equipment”
14:30-15:30	Lunch
15:45-18:00	<p>Work sections</p> <p>Room 1 Section 5</p> <p>Unsteadiness and aeroelasticity in turbomachines</p>

	<p>Moderator: Rudolf Izmailov (Eng. Sc. D.), Prof. of Compressor, Vacuum and Refrigerating Equipment Department, St. Petersburg Polytechnic University</p> <p>Reports:</p> <ul style="list-style-type: none"> ● A.L. Khavkin, Ya. Z. Guzelbaev (PJSC “NII turbokompressor” n.a. V.B. Shnepp”, HMS Group) "Experience in applying surge detectors based on statistical processing of signals from the operating parameters sensors of centrifugal compressors” ● V.E. Saren (“CIAM n.a. P.I. Baranov”) “Methods to reduce pressure pulsation and noise emitted in axial compressors” ● R.A. Izmaylov (St. Petersburg Polytechnic University) “Nonstationary processes in a centrifugal compressor: from a physical experiment to a virtual bench” ● A.Yu. Pavlov (Siemens Gas turbines Ltd) “Computational and experimental investigation of potential flutter in axial compressor blades” <p>Room 2 ASCOMP meeting</p>
18:00-18:30	Summary of the Conference

