



Ministry of Science and Higher Education of the Russian Federation
Federal State Autonomous Educational Institution for Higher Education
Northern (Arctic) Federal University named after M.V. Lomonosov

**PROGRAM OF THE
5th INTERNATIONAL CONFERENCE
IN MEMORY OF PROFESSOR VALERY KOMAROV**

**THE ISSUES IN MECHANICS
OF PULP-AND-PAPER MATERIALS**



September 11 – 14, 2019

Arkhangelsk
Russia

Dear colleagues!

You are cordially invited to take part in the V International conference in memory of Professor Valery Komarov «The issues in mechanics of pulp-and-paper materials» which is held in September, 11–14, 2019, Arkhangelsk, Russia.

Discussion will be focused on the results of the analytical and experimental investigations. Priority directions of basic research concerning evaluation and predicting deformation and strength properties of pulp, paper and cardboard will be defined.

Venue of the Conference

Northern (Arctic) Federal University (NArFU)
The Intellectual Center – scientific Library named by E.I. Ovsyankina,
Assembly Hall
1, Smolny Buyan St.

Organizing Committee address

Northern (Arctic) Federal University (NArFU)
17, Severnaya Dvina Emb.,
Arkhangelsk, 163002
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Destination (how to reach the place by public transport):

From the railway station: by the bus N 54 – to end of the line; N 1 – to the “Gymnasium 21st”;

From the airport: by the bus N 12 – to the end of the line;

In the city area: by the buses N 1, 3, 7, 11, 12, 42, 44, 54, 62, 76, 134, 144 – to maritime-and-river boat station (MRV), NArFU, “Dvinskiye zory”, “Gymnasium 21st”.

Conference working languages are Russian and English.

Time allocation:

The presentation will last for 25 minutes (plenary reports) – 15 minutes (section reports) followed by a 5-minute discussion period.

The poster must be no less than A1 and no larger than A0 size.

The 5th International conference
«THE ISSUES IN MECHANICS OF PULP-AND-PAPER MATERIALS»

September, 11–14, 2019
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Arkhangelsk, Russia

Conference organizers



Ministry of Science and Higher Education of the Russian Federation



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The conference is supported by



Open Society «Arkhangelsk Pulp and Paper Mill»



LLC «The Consolidated Paper Mills»



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Forest Journal

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Organizing committee

Akim, E.L. <i>Chairman</i>	Member of UN FAO Advisory Committee on Sustainable Forest-based Industries, D.Sc. in engineering, Professor, SPbSUITD, Russia
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Sevastyanova, Ju.V.	Director of Innovative facilities Engineering and Innovation Center «Advanced Northern Bioresources Processing Technologies», As. Professor, NArFU, Russia
Kuznetsova, N.A.	Head of organization and communications office, NArFU, Russia
Smolin, A.S.	D.Sc. in engineering, Professor, SPbSUITD, Russia
Zybulsky, Udo	Export director «BIM Finland OY», Ph.D., Finland
Chernaya, N.V.	D.Sc. in engineering, Professor of Department of chemical processing of wood, Professor, BSU, Belorussia
Shcherbak, N.V.	As. Professor, NArFU, Russia

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Scientific and social program

Tuesday, September, 10

Arrival of participants. Accommodation in hotels

Wednesday, September, 11

- 9:00–9:30 Registration
9:30–10:00 Opening
10:00–13:30 Plenary session
13:30–14:15 Lunch
14:15–18:20 Session “Physical bases and methods of evaluation of mechanical behavior of pulp, paper and cardboard”

Thursday, September, 12

- 9:00–17:30 Poster session
9:00–13:00 Session “New strategies for improving the mechanical properties of technical cellulose, paper and cardboard”
13:20–14:00 Lunch
14:00–15:40 Session “Prospects of save-resource methods for producing paper and cardboard from the recycling raw materials”
16:00–17:30 Session “Nanotechnology to obtain new types of pulp and of materials paper-like”
17:30–18:00 Round table. Closing of the conference
18:30 Ceremonial Dinner

Friday, September, 13

- 8:00–20:00 Offsite event and Cultural Program

Saturday, September, 14

Departure of participants

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Scientific program

Wednesday, September, 11

9:00–9:30 Registration continues
9:30–10:00 Opening

WELCOME

D.Phil., Professor, Rector, *Elena Kudryashova*
DSc (Physical and Mathematical Sciences), Vice-Rector for Research and
Innovations, As. Professor, *Marat Evseev*
PhD (Pedagogical Sciences), Director of the Higher school of Natural Sciences and
Technologies, As. Professor, *Svetlana Lukina*
Leaders and representatives of conference partners.

10:00–13:30

PLENARY SESSION

Co-chairmen: Yakov Kazakov, Eduard Akim

- 10:00–10:25 Biorefining of plant raw materials, circular economics and
problems of wood mechanics and pulp and paper materials
Eduard Akim, Saint-Petersburg State University of Industrial
Technologies and Design (Russia)
- 10:25–10:50 Analysis of the dynamics of Russian market and of the quality of
recycled paper up to 2025
Dmitry Dulkin, LLC «Consolidated Paper Mill» (Russia)
- 10:50–11:15 Kinetics of deformation of pulp and paper materials at tensile test
Yakov Kazakov, Northern (Arctic) Federal University (Russia)
- 11:15–11:40 The effectiveness issues in the refining process of fibrous semi-
finished products when deep chemical processing of wood
Yuriy Alashkevich, Reshetnev Siberian State University of Science
and Technology (Russia)
- 11:40–12:00 Coffee break
- 12:00–12:15 «Forestry journal»: experience and traditions in a new format
Nikolay Bogdanovich, Northern (Arctic) Federal University (Russia)
- 12:15–12:40 System of education and research on forestry and paper in Vietnam
Tran Van Chu, Hoang Van Sam
Vietnam National University of Forestry (Vietnam)

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12:40–13:05 Modern trends in the development of corrugated cardboard technology
Alexander Smolin, Graduate School of Technology and Energy St. Petersburg State University of Industrial Technology and Design (Russia)

13:05–13:30 The formation of secondary cell walls of plant fiber
Eugeny Novozhilov, Dmitry Chukhchin, Ksenia Bolotova
Northern (Arctic) Federal University (Russia)

13:30–14:15 Lunch

14:15–18:00

Session

**«PHYSICAL BASES AND METHODS OF EVALUATION
OF MECHANICAL BEHAVIOR OF PULP, PAPER AND
CARDBOARD»**

Moderators: Alexander Smolin, Albert Kanarsky

14:15–14:35 Macro and microscopic approach to measuring surface roughness of paper materials
N.V. Zholnerovich², M.G. Mikhaleva¹, D.N. Vtyurina¹, G.G. Politenkova¹, S.Yu. Sarvadiy¹, S.N. Nikol'skij¹, S.V. Stovbun¹, N.A. German², I.V. Nikolaychik²

¹FRCCP RAS, Moscow, Russia

²Belarusian State Technological University, Minsk, Belarus

14:35–14:55 Organization of inter-laboratory reconciliation in Russia
M.N. Kuzina, V.I. Kuzin
PTA – Saint-Petersburg (Russia)

14:55–15:15 Transverse viscoelastic properties of pulp fibers investigated with atomic force microscopy
C. Czibula^{1,3}, C. Ganser^{1,3}, T. Seidlhofer^{2,3}, C. Teichert^{1,3}, U. Hirn^{2,3}

¹Institute of Physics, Montanuniversitaet Leoben (Austria)

²Institute for Paper, Pulp and Fibre Technology, Graz University of Technology (Austria)

³Christian Doppler Laboratory for Fiber Swelling and Paper Performance, Graz University of Technology (Austria)

- 15:15–15:35 Research of the multilayered cardboard cross section with use of technology of ion beam cutting
N.P. Midukov¹, Y.V. Kazakov², V.S. Kurov¹, A.S. Smolin¹, S. Heinemann³
¹St. Petersburg State University of Industrial Technology and Design (Russia)
²Northern (Arctic) Federal University (Russia)
³Technical university of Dresden (Germany)
- 15:35–15:55 The influence of the anisotropy degree on the distribution of local deformations in the paper sample under tension
A.N. Romanova, Y.V. Kazakov, A.V. Malkov
Northern (Arctic) federal university (Russia)
- 15:55–16:20 **Coffee break**
- 16:20–16:40 Structural influences on reversible and irreversible curl
Harter T.^{1,2}, Hirn U.^{1,2}
¹Institute for Paper, Pulp and Fibre Technology, Graz University of Technology (Austria)
²Christian Doppler Laboratory for Fiber Swelling and Paper Performance, Graz University of Technology (Austria)
- 16:40–17:00 Papermaking properties of chemical pulp
M.G. Mikhaleva, G.G. Politenkova, S.N. Nikol'skij, S.V. Stovbun
FRCCP RAS (Russia)
- 17:00–17:20 Corrugated board. Calculation of the compressive strength in terms of strength of the constituent layers
A.M. Idiatullin¹, E.A. Glezman², A.M. Guryanov², V.A. Zhitnyuk³, I.P. Ryabov², N.A. Tarakanova¹
¹LLC “Technoboom-2” (Russia)
²Group of companies “Perm Pulp and Paper Company” (Russia)
³Selenginsky pulp and cardboard mill (Russia)
- 17:20–17:40 Fluting. Determination of composition upon indications of brightness
E.V. Belkina¹, A.M. Idiatullin², E.A. Glezman¹, A.M. Guryanov¹, M.N. Spasennikov¹, V.A. Zhitnyuk³, N.A. Tarakanova²
¹ Group of companies “Perm Pulp and Paper Company” (Russia)
² LLC “Technoboom-2” (Russia)
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- 17:40–18:00 Effect of plant fibers grinding on water sorption of glued paper
D.I. Malyutina, A.S. Smolin
Saint Petersburg State University of Technologies and Design (Russia).
- 18:00–18:20 Discussion

Thursday, September, 12

9:00–13:00

Session

**«NEW STRATEGIES FOR IMPROVING THE
MECHANICAL PROPERTIES OF TECHNICAL
CELLULOSE, PAPER AND CARDBOARD»**

Moderators: Galina Komarova, Yulia Sevastyanova

- 9:00–9:20 The influence of refining conditions on the physical and mechanical properties of pulp
A.V. Koksharov, E.V. Belykh
Ilim Group (Russia)
- 9:20–9:40 Grinded fiber semi-finished products using inertial bodies
I.A. Voronin¹, Yu.D. Alashkevich², N.S. Reshetova¹
¹Siberian state university of science and technologies name of the academician M.F. Reshetnev (Russia)
²Institute of Chemistry and Chemical Technology SB RAS (Russia)
- 9:40–10:00 Vacuum system is a key to save the pulp and paper mill resources
M.V. Lomov, G.A. Vishniakov, I.A. Iavorskii
BKT-Service (Russia)
- 10:00–10:20 Scale in pulp and paper industry. Advanced technique of selection of mineral deposits formation inhibitors
M.E. Romanov¹, Udo Zibulski²
¹BKT-Service (Russia)
²BIM Finland OY (Finland)
- 10:20–10:40 Features of preparation of pulp for the directional regulation of physical, mechanical and printing properties of molded packaging from recycled fiber
L.G. Makhotina St. Petersburg state University of industrial technologies and design (Russia)

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- 10:40–11:00 Peculiarities of knifeless of fiber semi-products in pulp and paper production
I.S. Tikhonov, V.A. Kozhukhov, Yu.D. Alashkevich
Reshetnev Siberian State University of Science and Technology (Russia)
- 11:00–11:20 Coffee break
- 11:20–11:40 Strength and deformation properties of pulp from tropical wood
H.M. Khoa, M.I. Makarov, E.O. Okulova, Y.V. Kazakov
Northern (Arctic) Federal University (Russia)
- 11:40–12:00 Trumpjet flash mixing technology for PM/BM and effect of its operation
Elena Samtsova
Makorus Co. Ltd. (Russia)
- 12:00–12:20 Digitalization on its way to impact strength properties
Roland Berger
BTG Instruments GmbH (Germany)
- 12:20–12:40 Refining of fibrous semi-finished products in the preparation of moisture-resistant paper grades
V.A. Kozhukhov, R.O. Izergin, Yu.D. Alashkevich
Reshetnev Siberian State University of Science and Technology (Russia)
- 12:40–13:00 Using organic fillers to reduce paper density
E.V. Kurkova, O.S. Martyanova, K.S. Arkhipov, G.E. Ivanov
Research Institute – Branch of Goznak Joint-Stock Company (Russia)
- 13:00–13:20 Aspects of determining a species composition of hardwood semi-finished products
E.O. Okulova, A.V. Guriev
Northern (Arctic) Federal University (Russia)
- 13:20–14:00 Lunch

14:00–16:00

Session

**«PROSPECTS OF SAVE-RESOURCE METHODS FOR
PRODUCING PAPER AND CARDBOARD FROM THE
RECYCLING RAW MATERIALS»**

Moderators: Evgeny Novozhilov, Yuri Alashkevich

- 14:00–14:20 Workshop: Effective Methods for Promoting Scientific Information
A.M. Komarova, O.P. Lebedeva, L.A. Zhgileva, O.E. Boldireva
Northern (Arctic) Federal University (Russia)
- 14:20–14:40 Hemical and biocatalytic conversion of secondary resources of vegetable raw materials
A.V. Kanarsky, I.A. Khusainov, T.Z. Ha, L.A. Mingazova, Z.A. Kanarskaya, E.R. Yakubov
Kazan National Research Technological University (Russia)
- 14:40–15:00 Theoretical and technological aspects of the stock preparation of pulp from secondary fiber
Adriano Lovato
S.T.Macchine SpA (Italy)
- 15:00–15:20 Prediction of the cardboard product quality using the machine learning methods
D.N. Zhirnov¹, E.V. Dernova², D.A. Dulkan²
¹LLC «Suhonsky BPM», Sokol, Russia
²LLC «Consolidated Paper Mill», Moscow, Russia
- 15:20–15:40 Water as one of the main precursors of increase mechanic and chemical characteristics of pulp and paper products
T.E. Boikova, N.I. Bogdanovich, S.N. Dolgoborodova, T.S. Mauricheva
Northern (Arctic) Federal University (Russia)
- 15:40–16:00 Coffee break

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16:00–17:30

Session

**«NANOTECHNOLOGY TO OBTAIN NEW TYPES
OF PULP AND OF MATERIALS PAPER-LIKE»**

Moderators: Vladimir Dubovy, Natalia Shcherbak

- 16:00–16:20 Use of mineral fibrous semi-finished products as a raw material for the production of technical types of paper
V.K. Dubovy, N.A. Krinitsin, G.A. Suslov
Saint Petersburg State University of Technology and Design (Russia)
- 16:20–16:40 Promising areas for the use of lignin-containing powder celluloses
V.N. Sunait, L.G. Machotina
Saint Petersburg State University of Industrial Technologies and Design (Russia)
- 16:40–17:00 New non-woven fiberglass materials
N.V. Shcherbak
Northern (Arctic) Federal University Russia
- 17:00–17:20 Structural changes in cell walls of plant fiber in the process of enzymatic treatment
*A.A. Guryanova¹, K.S. Bolotova², D.G. Chukhchin²,
I.V. Tyshkunova³, E.V. Novozhilov²*
¹GUPCO Pharmacy
²Northern (Arctic) Federal University
³LLC People's Enterprise «Arkhangelsk bread»
- 17:20–17:30 Discussion
- 17:30–18:00 Round table. Closing of the Conference**

POSTERS

- P-I Properties of the secondary fibers from wet strength of the wastepaper with polyurethan covering
Yu.D. Alashkevich, R.Z. Pen, V.A. Kozhukhov, I.A. Voronin, N.V. Karetnikova, L.V. Chendylova
Reshetnev Siberian State University of Science and Technology (Russia)
- P-II Trends in integrated automation
E.L. Alimpiev
Arkhangelsk PPM (Russia)
- P-III The effect of a peroxide-acetate cooking conditions on fractional composition of pulp from flax shives
D.Yu. Arsenyeva, Y.V. Kazakov, E.O. Okulova
Northern (Arctic) Federal University (Russia)
- P-IV Surface properties of modified cardboard
S.I. Basyrova, M.F. Galikhanov
Kazan National Research Technological University (Russia)
- P-V Mineral fiber-based paper for evaporative air coolers
R.R. Bikmurzin, E.V. Dubovoy
LLC “KB EVA” (Russia)
- P-VI The creation and study of properties of new materials based on a mixture of bacterial and vegetable cellulose
S.V. Bulygina, Yu.V. Sevastyanova
Northern (Arctic) Federal University (Russia)
- P-VII A separate paper-forming property of the fiber with a blade during intralask implementation method of grinding
D.Yu. Vasilyeva, L.V. Yurtaeva, Yu.D. Alashkevich
Siberian state University of science and technology named after academician M. F. Reshetnev (Russia)
- P-VIII Comparative analysis of mechanical properties of cellulite the vines of cereals, obtained by the oxidation organosolvent way
A.V. Vurasko¹, E.I. Simonova¹, A.R. Minakova¹, V.P. Sivakov¹, Y.V. Kazakov²
¹Ural State Forestry University, Yekaterinburg, Russia
²Northern (Arctic) Federal University, Arkhangelsk, Russia

- P-IX The creation of filter paper for biological fluids with the addition of bacterial cellulose
A.A. Gilyazova¹, E.K. Gladysheva², Yu.V. Sevastyanova¹
¹Northern (Arctic) Federal University (Russia)
²Institute for Problems of Chemical and Energetic Technologies, Siberian Branch of the Russian Academy of Sciences (Russia)
- P-X Influence of synthesis conditions of the polyelectrolyte complex alginate-chitosan on the deformation and strength attributes of the films on its basis
A.N. Gorshkova¹, O.S. Brovko¹, K.G. Bogolitsyn^{1,2}, I.A. Palamarchuk¹, Y.V. Kazakov²
¹N. Laverov Federal Center for Integrated Arctic Research (Russia)
²Northern (Arctic) Federal University (Russia)
- P-XI The influence of drying process on the fracture toughness of pulp and paper products
E.V. Dernova, V.V. Gorazdova
LLC « Management Company «United paper mills» (Russia)
- P-XII Resin difficulty in the production of bleached kraft pulp from a mixture of birch and aspen wood
A.A. Dryahlicin, Yu.V. Sevastyanova
Northern (Arctic) Federal University (Russia)
- P-XIII Decrease in fiber content in production waste of sanitary paper and the main areas of the use of production residuals
A.V. Dyu
SCA Hygiene Products Russia LLC Svetogorsk branch (Russia)
- P-XIV Hardness of backwater – its causes and influence on the quality of container board
I.M. Zhirnova¹, V.V. Gorazdova², E.V. Dernova^{2,3}, M.A. Pulyaeva³
¹LLC «Suhonsky BPM», Sokol, Russia
²LLC « Management Company «United paper mills» (Russia)
³Northern (Arctic) Federal University (Russia)
- P-XV The contribution of surface phenomena in increasing the physical and mechanical properties of paper materials
N.V. Zholnerovich
Belarusian State Technological University (Belarus)

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- P-XVI The study of hydrogen bonds in paper structure by IR Fourier spectroscopy
V.I. Ivanov-Omsky¹, A.S. Smolin², R.O. Shabiev²
¹The Ioffe Institute (Russia)
²Saint Petersburg State University of Technologies and Design (Russia)
- P-XVII Practical experience in improvement of efficiency of flocculation processes in the technology of sanitary paper
A.A. Kazakevich, N.V. Zholnerovich
Belarusian State Technological University (Belarus)
- P-XVIII The influence of mode of grinding on physical and mechanical properties of bleached kraft pulp
E.V. Kaplyov, L.V. Yurtaeva, Yu.D. Alashkevich
Siberian state University of science and technology named after academician M. F. Reshetnev (Russia)
- P-XIX Obtaining the effective heat-and-sound bio-insulating material for the construction industry
V.A. Kozhukhov, S.G. Luchinkin, Yu.D. Alashkevich
Reshetnev Siberian State University of Science and Technology (Russia)
- P-XX Influence of the conditions of pulping kraft softwood pulp on its physical and mechanical properties
A.V. Koksharov
Ilim Group (Russia)
- P-XXI Laboratory kraft pulping of fir
A.V. Koksharov, E.V. Belykh
Ilim Group (Russia)
- P-XXII Laboratory pulping of kraft pulp at low and high pulp consistency
A.V. Koksharov
Ilim Group (Russia)
- P-XXIII Comparison of grinding rates of kraft hardwood and softwood pulp with high lignin content
A.V. Koksharov, E.V. Belykh
Ilim Group (Russia)

- P-XXIV Complex processing of rice husk to produce fibrous semi-finished products
*V.V. Koptyaev¹, Yu.V. Sevastyanova¹, D.A. Dulkan¹,
A.V. Kanarsky², T.D. Ha², Z.A.Kanarskay², E.R.Yakubov²*
¹Northern (Arctic) Federal University (Russia)
²Kazan National Research Technological University (Russia)
- P-XXV Modern methods of determining the paper-forming properties of fibrous semi-finished products
V.V. Koptyaev¹, Yu.V. Sevastyanova¹, N.Yu. Potasheva²
¹Northern (Arctic) Federal University (Russia)
²LLC «RK-Grand» (Russia)
- P-XXVI Development of a technology for the production of bleached sulfate pulp in harsh technology conditions
*T.A. Koroleva, L.A. Milovidova, M.A. Ikonnikova,
A.A. Dryahlitsyn, V.V. Medvedev*
Northern (Arctic) Federal University (Russia)
- P-XXVII Papermaking properties of pulp from wood of introduced forest crops
A.A. Maslennikova, E.O. Okulova, Y.V. Kazakov, N.A. Babich
Northern (Arctic) Federal University (Russia)
- P-XXVIII Efficiency of using a mobile barrier with a knifeless grinding of fibrous semi-finished products
R.A. Marchenko, Yu.D. Alashkevich
Reshetnev Siberian State University of Science and Technology (Russia)
- P-XXIX Superspiralization – fundamental property of biosystems. Cellulose fibre
*S.N. Nikolsky, M.G. Mikhaleva, G.G. Politenkova,
A.S. Vedenkin, D.V. Zlenko, S.V. Stovbun*
N.N. Semenov Federal Research Center for Chemical Physics RAS (Russia)
- P-XXX Justification for the introduction of OAT steps in bleaching schemes
Yu.V. Sevastyanova
¹Northern (Arctic) Federal University (Russia)

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- P-XXXI Paper web quality engineering on equipment dynamic characteristics
V.P. Sivakov, A.V. Vurasko
Ural State Forestry University (Russia)
- P-XXXII Combination of filter material with sorbents for cleaning air in personal respiratory protective equipment
M.V. Talipova, A.V. Liang
“Sorbent” JSC (Russia)
- P-XXXIII The effect of endoglucanase treatment on the characteristics of bleached kraft hardwood pulp during its recycling
K.Yu. Terentyev, M.M. Lysachenkova, M.A. Holmova, E.V. Novozhilov
Northern (Arctic) Federal University (Russia)
- P-XXXIV Water soluble paper and cardboard
E.A. Toptunov, A.M. Samukhin, N.V. Shcherbak
Northern (Arctic) Federal University (Russia)
- P-XXXV Reduction of variability of indicators of work PM-2 of cardboard-paper production the branch of the JSC "ILIM GROUP" in Koryazhma
S.I. Tretyakov¹, S.S. Dementev²
¹Northern (Arctic) Federal University (Russia)
²Branch of the JSC "ILIM GROUP" in Koryazhma (Russia)
- P-XXXVI The increase in the degree of grinding when using a headset with involute-shaped knives
O.N. Fedorova, E.V. Abrosimov, Yu.D. Alashkevich
Reshetnev Siberian State University of Science and Technology (Russia)
- P-XXXVII The technology of using polyamide resin with bifunctional properties for hardening and hydrophobization of paper and cardboard
V.L. Fleisher, N.V. Chernaya
Belarusian State Technological University (Belarus)
- P-XXXVIII Optimization of hydrodynamic modes of vortex flowmeters in pulp and paper manufacture main title
A.S. Frolov, Yu.D. Alashkevich, M.S. Lurie, O.M. Lurie
Reshetnev Siberian State University of Science and Technology (Russia)

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- P-XXXIX The effect of wood species on results of laboratory refining of kraft bleached pulp
M.A. Holmova
Northern (Arctic) Federal University (Russia)
- P-XXXX Analysis of softness and fiber composition of pulp-based tissues
R.O. Shabiev
Saint-Petersburg State University of Industrial Technologies and Design (Russia)
- P-XXXXI Development of technology of receiving cellulose of the high exit from miscanthus
I.A. Shanyazov¹, Yu.A. Gismatulina²
¹Northern (Arctic) Federal University (Russia)
²Institute for Problems of Chemical and Energetic Technologies, Siberian Branch of the Russian Academy of Sciences (Russia)
- P-XXXXII Technology of obtaining white-hemi-finished product from miscanthus
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- P-XXXXIII Determination of the optimum mode of film suspension size when using the headset with the curvilinear form of knives
V.I. Shurkina, R.A. Marchenko, Yu.D. Alashkevich
Reshetnev Siberian State University of Science and Technology (Russia)
- P-XXXXIV Complex parameter as assessment factor for the processing quality of fibrous suspension
L.V. Yurtaeva, Yu.D. Alashkevich
Siberian state University of science and technology named after academician M. F. Reshetnev (Russia)

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