



Summary table for operation results of CMKA® heat exchange elements

| Power plant | Boiler type | RAH type | Fuel type | Results (according to the data of the plants technical reports) | Contacts |
|--|--------------------|-----------------|------------------|--|--|
| Avtovo CHP-plant (CHP-plant – 15) | TГM-84Б No.7 | PBII-54 | gas | The temperature of released gases has lowered by 15°C as compared with the boiler condition before repair. Heat loss with flue gases has been lowered. Boiler gross efficiency has increased by 1.23% and become 93.58%. | Reception: 007 (812) 9014159 Dmitry Molofeev Deputy Chief Engineer |
| Arkhangelsk CHP-plant | TГM-84Б No.4 | PBII-54 | mazut | The temperature of released gases has lowered by 19°C and got 38°C less than the norm. Temperature head of RAH has got twice (33°C) less that proves high thermal effectiveness of the heat exchange elements. Boiler gross efficiency has increased by 1.33% and got 1.41% greater than the norm. | Reception: 007 (8182) 463359 Valery Oparin Head of Operation Department |
| | TГM-84Б No.5 | PBII-54 | mazut | The resistance of RAH heat exchange elements has gone 10% down and remained at the level of the measurements determined in the technical assignment. Power consumption for traction and blast has lowered by 0.79 kWatt-hour/Gcal and got 0.49 kWatt-hour/Gcal less than the norm. Temperature head of RAH has got 1.5 times (17°C) less. Boiler gross efficiency has increased and got 92% greater on average. All the changes in the boiler's functioning shown above economize fuel greatly. Taking into account high fuel cost, it gives positive economical and ecological effect on CHP-plant functioning. | |
| Astrahan CHP-plant -2 | TГME-464 No.4 | PBII-88 | gas | The temperature of released gases has lowered by 34°C in relation to the data of the boiler functioning prior to carried out modernization. Hot air temperature at RAH outlet has increased by 59°C. RAH resistance by gas has lowered by 15 mm of water column. RAH resistance by gas has lowered by 10 mm of water column. Boiler gross efficiency has increased by 1.74% and has got 95.96%. | Reception: 007 (8512) 482200 Igor Grigoriev Deputy Chief Engineer for Operation |
| | TIIIE-430 No.2 | PBII-68 | gas | The temperature of released gases has lowered by 26°C in relation to the data of the boiler functioning prior to carried out modernization. Hot air temperature at RAH outlet has increased by 36°C. RAH resistance by gas has lowered by 15 mm of water column. RAH resistance by gas has lowered by 10 mm of water column. Boiler gross efficiency has increased by 1.44% and has got 95.27%. | |



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| Balakovo CHP-plant-4 | TGM-84A | PBII-54 | gas | The temperature of released gases has lowered by 63°C in relation to the data of the boiler functioning prior to carried out modernization. Boiler gross efficiency has got 95.08% that is 2.42% greater than the norm. Calculated fuel economy – 3.7 million normal m ³ /year. Calculated payback period of heat exchange elements – 1.14 years. | Reception: 007 (8453) 624650 Alexander Lantuh Head of Production and Technical Department |
| Engels CHP-plant-3 | BK3-320-140 No.6 | PBII-54 | gas | The temperature of released gases has lowered by 42°C. Heat loss with released gases has lowered. Boiler gross efficiency has increased by 2.4% and got 92.61%. Air heating in RAH has increased by 55 °C and got 252-262 °C. | Reception: 007 (8453) 954890 Valery Vilkov Head of Boiler-Turbine Workshop |
| Irikino SDPP | TGMII-314 No.7 | PBII-68 | gas | The temperature of released gases has lowered by 7°C and got 4°C less than the norm. Hot air temperature has increased by 9°C. RAH resistance by gas has lowered by 90-120 mm of water column and corresponds to the norm. Heat loss together with released gases has lowered by 0.45% and got 0.25% less than the norm. Boiler gross efficiency has increased by 0.62% and got 93.35% that is 0.45% greater than the norm. | Reception: 007 (35363) 51359 Anatoly Shistrov Head of Setup Workshop |
| Kamishin CHP-plant | BK3-160-100GM | PBII-3600 | mazut | Aerodynamic resistance of air heater has lowered, flue gas temperature has lowered to normative values, boiler gross efficiency has increased. | Technical Director Alexander Kuraev |
| Kazan CHP-plant -1 | TGM -84 No.9 | PBII-54 | gas | The temperature of released gases has lowered by 18°C. Hot air temperature has increased by 50°C. Heat loss with released gases has lowered by 1.24%. Boiler gross efficiency has increased by 1.4% and got 94.34%. | Reception: 007 (843) 2676681 Iskander Zaynutdinov Deputy Head of Repair of Boiler-Turbine workshop |
| | TGM-84 No.11 | PBII-54 | gas | The temperature of released gases has lowered by 13/20°C. Hot air temperature has increased by 47/42 °C. Heat loss with released gases has lowered. Boiler gross efficiency has increased by 1,28% and got 93,48%. | Chief Engineer Eduard Gilyazeev |



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| Kazan CHP-plant-3 | TГM-84Б No.3 | PBII-54 | gas | The temperature of released gases has lowered by 18°C. Hot air temperature has increased by 17/7°C. Heat loss with released gases has lowered. Boiler gross efficiency has increased by 1.75% and got 94.71% that is 0.75% greater than the norm. Calculated payback period of heat exchange elements – 1.9 years. | Reception: 007 (843) 5720359 Andrey Kondratiev Deputy Head of Boiler-Turbine workshop |
| | TIIЕ-429 No.6 | PBII-68 | gas | Heat loss with released gases has lowered. Boiler gross efficiency has increased by 0.62% and got 94.52%. RAH resistance by air has lowered by 35 mm of w.c., by gas – by 39 mm of w.c, | |
| Kishinev CHP-plant-2 | TГM-96Б No.1 | PBII-68 | gas | The temperature of released gases has lowered by 10°C. Heat loss with released gases has lowered. Boiler gross efficiency has increased by 0.92% and got 94.2%. RAH resistance by air has lowered by 72 mm of w.c., by gas – by 69 mm of w.c, | Reception: +37322385359 Technical Director Mikhail Sorbale |
| | TГM-96Б No.2 | PBII-68 | gas | RAH resistance by air and gas has lowered. Flue gas temperature has lowered. Boiler gross efficiency has increased by 1.41%. | |
| Konakovo SDPP | ПK-41 No.2 | BIIП-4 | газ | Fuel consumption has reduced. Flue gas temperature has lowered and that led to the increase of boiler gross efficiency up to 92.15%. | Reception: 007 (48242) 38350 Nikolay Temerov Head of Setup Department |
| | ПK-41 No.3 | BIIП-4 | gas | Regeneration coefficient has increased by 2% that has led to the lowering of temperature of released gases by 12°C and increase of hot air temperature by 12-13°C. Aerodynamic resistance has lowered that has led to decrease of auxiliary electric power consumption. Boiler gross efficiency has increased by 0.74%. | |
| Mosenergo CHP-plant-25 | TГMII-314 No.3 | PBII-98 | gas | The temperature of released gases has lowered by 5°C. Heat loss with released gases has lowered. Boiler gross efficiency has increased by 0.25% and got 92.3%. RAH resistance by air has lowered by 30 mm of w.c., by gas – by 35 mm of w.c, | Reception: 007 (495) 4428290 Vladimir Petrov Deputy Chief Engineer |
| | TГMII-84Б No.1 | PBII-54M | gas | The temperature of released gases has lowered by 7°C. Heat loss with released gases has lowered. Boiler gross efficiency has increased by 0.42% and got 92.1%. RAH resistance by air has lowered by 15 mm of w.c., by gas – by 20 mm of w.c, | |

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| Naberezhnye Chelny CHP-plant | TGM-84Б No.2 | PBII-54 | gas | The temperature of released gases has lowered by 5°C. Heat loss with released gases has lowered. Boiler gross efficiency has increased by 0.9% and got 94.54%. RAH resistance by air has lowered by 110 mm of w.c., by gas – by 30 mm of w.c., | Reception: 007 (8552) 746359 Vitaly Mosalskikh Deputy Head of Boiler Workshop for operation |
| | TGM-84Б No.6 | PBII-54 | gas | The temperature of released gases has lowered by 24°C. Heat loss with released gases has lowered. Boiler gross efficiency has increased by 1.09% and got 94.64%. RAH resistance by gas has lowered by 10 mm of w.c. | |
| Nizhnekamsk CHP-plant-1 | TGM-84Б No.7 | PBII-54 | gas | Heat loss with released gases has lowered. Boiler gross efficiency has increased by 1.05% and got 93.67%. | Reception: 007 (8555) 321359 Vladimir Kozlov Deputy Chief Engineer for Operation |
| | TGM-84Б No.10 | PBII-54 | gas | The temperature of released gases has lowered by 27°C. Heat loss with released gases has lowered. Boiler gross efficiency has increased by 1.43% and got 94.13%. | |
| | TGM-96Б No.12 | PBII-68M | gas | The temperature of released gases has lowered by 5°C. Heat loss with released gases has lowered. Boiler gross efficiency has increased by 0.51% and got 94.33%. | |
| | TGM-96Б No.15 | PBII-68M | gas | Heat loss with released gases has lowered. Boiler gross efficiency has increased by 0.16% and got 94.27%. RAH resistance by air has lowered by 87 mm of w.c., by gas – by 20 mm of w.c., | |
| | TGM-96Б No.5 | PBII-68 | gas | The temperature of released gases has lowered. Outlet air temperature has increased. | |
| Nizhnekamsk CHP-plant OJSC | TGME-464 No.7 | PBII-88 | gas | Flue gas temperature has lowered by 2°C Boiler gross efficiency has increased by 0.18% and become 95.18 %. RAH air resistance lowered by 27 kgf/cm ² and gas resistance – by 36 kgf/cm ² . | Reception: (8555) 321659 Chief Engineer Alexander Sherstobitov |

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| Novo-Salavat CHP-plant | TGM-84 A No.2 | PBII-54 M | gas | Boiler gross efficiency has increased from 92,59% to 94,12%, flue gas temperature has lowered from 157°C to 135°C. | Reception: (3476) 351401 Director Valentin Talaev |
| Northern CHP-plant - 21 | TGM -96Б No.2, 4 | PBII-68 | gas | Released gases temperature at RAH outlet has lowered: - for boiler No.2 – by 17.5°C. – for boiler No.4 – by 28°C. RAH resistance has lowered: - for boiler No.2 – by 33 kg/m ² – for boiler No.4 – by 34 kg/m ² | Reception: 007 (812) 9015051 Oleg Shkurov Chief Engineer |
| Novo-Ryazan CHP-plant | TGM-84 No.9 | PBII-54 | gas | The temperature of released gases has lowered by 25°C. Heat loss with released gases has lowered by 3.63%. Auxiliary power consumption has lowered by 1.365 kW/h for the production of a ton of steam. Boiler gross efficiency has increased by 4.3% and got 94.292% (taking into account heating elements replacement as well). | Reception: 007 (4912) 241361 Vladimir Bulygin Head of Boiler-Turbine workshop |
| Pechora SDPP | TGME-206 No.1 | PBII-68 | gas | The temperature of released gases has lowered by 18°C. Heat loss with released gases has lowered. Boiler gross efficiency has increased by 0.474% and got 94.184%. RAH resistance by air has lowered by 10-30 mm of w.c., by gas – by 24-25 mm of w.c, | Reception: 007 (82142) 29359 Sergey Klassen Deputy Chief Engineer |
| Samara CHP-plant | BK3-420- 140-HГM3 No.1 | PBII-54 | gas | The temperature of released gases has lowered by 26°C - 30°C in comparison with the norm. Heat takeoff capacity has increased by 13% in comparison with the norm. Boiler gross efficiency has got 94.43% that is 1.43% greater than the norm. Calculated fuel economy – 2 million m ³ of natural gas if performance period makes up 4000 hours according to nominal parameters. | Reception: 007 (846) 9562422 Igor Atlasov Head of Capital Building Department |
| Severodvinsk CHP-plant-2 | TGME-464 No.3 | PBII-88H | mazut | The temperature of released gases has lowered by 21°C and got 29°C less than the norm. Heat loss together with released gases has lowered by 2%. Boiler gross efficiency has increased by 2% on average and got 93.49%. Fuel economy according to normative indices – 0.195 tons per hour. Calculated payback period of heat exchange elements – 1.36 years. | Reception: 007 (8184) 507159 Denis Krivoshchekov Head of Boiler-Turbine Workshop |
| Southern CHP-plant (CHP-plant-22) | TGMII-344A No.1 | PBII-98 | gas | The temperature of released gases has lowered. Boiler gross efficiency has increased by 1.47%. Specific consumption for traction and blast has lowered by 2.03 kWatt-hour/tons of steam. | Reception: 007 (812) 7721941 Sergey Istomin Chief Engineer |



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| Sredneuralsk SDPP | ТГМП-114 | РВП-68 | gas | The temperature of released gases has lowered by 5°C. RAH resistance by air has lowered by 30 mm of water column and by gas – for 40 mm of water column. Hot air temperature has increased by 7°C. Heat loss with released gases has lowered by 0.7%. Improvement of RAH operation indices will make it possible to save 700-800 tons equivalent fuel per year according to the preliminary assessment of the SDPP specialists. | Reception: 007 (34368) 25359 Vladimir Chernousov Deputy Head of Boiler-Turbine Workshop-2 |
| Sterlitamak CHP-plant | БК3-420-140 НГМ No.2 | РВП 54 | gas | Flue gas temperature in full range of loads is below normative value and doesn't exceed 122 °C in nominal mode. | Reception: (3473) 235100 Chief Engineer Alexander Kotkov |
| | БК3-420-140 НГМ No.3 | РВП 54 | gas | Flue gas temperature has lowered and doesn't exceed 124°C in nominal mode. | |
| Syzran CHP-plant | ТГМЕ- 464 No.12 | РВП-88 | gas | Load restrictions for 40 tons per hour has been eliminated because of the lack of blast. Air flows in RAH has lowered by 2%. Boiler gross efficiency has increased by 1.21%. Specific power consumption for blast has lowered by 1.39 kWatt-hour/Gcal. | Reception: 007 (8464) 936161 Dmitry Grebennikov Deputy Director |
| Troitsk SDPP | ПК-39 No.7 | ВПП-2 | coal | Heat takeoff by gas has increased. That allowed hot air temperature to be increased by 17 °C. Heat loss with released gases has lowered. Boiler gross efficiency has increased by 1.77% and got 88.97%. | Reception: 007 (35163) 59359 Alexander Polovnev Deputy Chief Engineer for Operation |
| | ПК-39 No.8 | ВПП-2 | coal | Outlet gas temperature has lowered by 13°C, outlet air temperature increased by 41°C. RAH resistance by gas has lowered by 67 mm of w.c., by air – by 30 mm of w.c. Boiler gross efficiency has increased by 0.56%. | |
| Tver CHP-plant No.4 | БК3-160-100ГМ No.14 | РВП-54 | gas | The temperature of released gases has lowered by 8°C. Heat loss with released gases has lowered. Boiler gross efficiency has increased by 0.4% and got 94.5%. RAH resistance by air has lowered by 2 mm of w.c., by gas – by 1 mm of w.c, | Reception: 007 (4822) 329859 Alexander Romanov Deputy Head of Boiler Workshop |
| | БК3-160-100ГМ No.15 | РВП-54 | gas | The temperature of released gases has lowered by 2°C. Heat loss with released gases has lowered. Boiler gross efficiency has increased by 0.7% and got 94.7%. RAH resistance by air has lowered by 135 mm of w.c., by gas – by 109 mm of w.c, | |

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| Ulyanovsk CHP-plant-2 | TTE-429 No.1A | PBII-68 | gas | The temperature of released gases has lowered by 8°C. Air suction in RAH has lowered by 5.5%. Specific power consumption for traction and blast has lowered by 1.82 kWatt-hour /tons of steam. Boiler gross efficiency has increased by 0.84%. Substantial savings of fuel have been achieved. | Reception: 007 (8422) 590759 Yury Chernyshev Head of Production and Technical Department |
| Voronezh CHP-plant-1 | БК3-160- 100ГМ No.15 | PBII-54 | gas | The temperature of released gases has lowered by 27°C and got 17°C less than the norm. Hot air temperature has increased by 20°C and exceeded the calculated values by 16°C. Heat loss with released gases has lowered. Boiler gross efficiency has increased by 1.71% and got 0.34% greater than the norm. | Reception: 007 (4732) 619359 Maxim Boev Head of Setup and Test Subdivision of Production and Technical Department. |
| | БК3-160- 100ГМ No.11 | PBII-3800 | gas | The temperature of released gases has lowered by 9°C (from 134°C to 125°C). Hot air temperature has increased from 179°C to 220°C. Heat loss with released gases has lowered. Boiler gross efficiency has increased by 0.45% and has got 93.77%. | |
| | БК3-160- 100ГМ No.13 | PBII-3800 | gas | The temperature of released gases has lowered by 25°C as compared with the boiler condition before repair. Heat loss with released gases has lowered. Boiler gross efficiency has increased by 1.44% and has got 94.42%. | |