

**“APROVED”**  
**Deputy Technical Director**  
**of Severodvinsk CHP-plant-2**  
**V.N.Grachev**  
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**TECHNICAL REPORT**

**ON THE TESTS OF POWER BOILER UNIT NO.3,  
AFTER THE REPLACEMENT OF HEAT EXCHANGE ELEMENTS OF RAH.**

**Test Manager:**  
**Deputy Director of Operation Department**

**O.A.Shumeiko**

**Engineer of Operation Department**

**T.V.Kozlova**

**Severodvinsk**  
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On the 6th of June, 2007, the tests of power boiler No.3, after the heat exchange elements replacement took place. The aim was to define technical and economic indices of the boiler unit operation.

The tests took place for the power boiler with steam demands of 280 t/h, 350 t/h and 450t/h. Mean values of the boiler operation indices are shown in table 1.

Calculations of the power boiler operation indices are shown in tables 2.1 – 2.3.

**Notes:**

1. The steam consumption from this power boiler is directed to fast-response pressure-reducing desuperheating station.
2. To provide released gas temperature after RAH not lower than 150°C (according to operational regulations), the solution was made to increase the air temperature after calorifers as compared to the norm.

**Conclusions:**

1. Real gross efficiency is considerably increased after the replacement of heat exchange elements by CMKA<sup>®</sup> ones.
2. The values of flows in RAH were restored to the standard values.

**SUMMARY TABLE**  
of average values received during tests of boiler No.3

Table No.1

No.	Parameter	Dimension	Test result		
			No.1	No.2	No.3
1	Fuel type		Mazut		
2	Fuel (low) heat value	Kcal/kg	8875		
3	Low heat value	%	6.3		
4	Moisture content of as-fired fuel	%	3.13		
5	Steam capacity	t/h	280	350	450
6	Temperature of superheated	°C	552	549	547
7	Temperature of feed water	°C	200	210	221
8	Temperature of gases before RAH	°C	296	314	339
9	Temperature of gases behind RAH	°C	150	155	159
10	Temperature of cold air	°C	27	30	35
11	Temperature of air before RAH	°C	108	99	96
12	Temperature of air behind RAH	°C	278	296	305
13	Air pressure before burners	kgs/m <sup>2</sup>	150	220	300

**SUMMARY TABLE**  
of technical and economic indices of boiler No.3 received during tests

Table No.2

No.	Parameter	Dimension	Tests data											
			Test No.1				Test No.2				Test No.3			
			before repair		after repair		before repair		after repair		before repair		after repair	
			norm	fact	norm	fact	norm	fact	norm	fact	norm	fact	norm	fact
1	Boiler heat load	Gkal/hour	-	177	-	170	-	217	-	217	-	265	-	267
2	Temperature of feed water	°C	230	203 <sup>1</sup>	230	200 <sup>1</sup>	230	203 <sup>1</sup>	230	210 <sup>1</sup>	230	224 <sup>1</sup>	230	221 <sup>1</sup>
3	Temperature of cold air	°C	20	15	20	27	20	20	20	30	20	20	20	35
4	Temperature of air before RAH	°C	93.3	71	94.1	108 <sup>2</sup>	88.8	81	88.8	99 <sup>2</sup>	83.3	70	83.1	96 <sup>2</sup>
5	Temperature of released gases	°C	177	164	176	150	181.7	172	181.7	155	187.5	180	187.7	159
6	Excess air coefficient between the sections of water economizer	-	1.108	1.07	1.120	1.117	1.063	1.061	1.063	1.061	1.041	1.041	1.041	1.041
7	Excess air coefficient after RAH	-	1.366	1.492	1.384	1.429	1.297	1.439	1.279	1.336	1.252	1.374	1.252	1.283
8	Heat loss with released gases	%	6.3	8.3	6.83	6.42	6.48	8.18	6.58	6.34	6.58	8.34	6.64	6.12
9	Boiler gross efficiency	%	93.12	91.2	92.57	92.98	93.04	91.34	92.95	93.18	93.03	93.27	93.97	93.49
10	Flows in RAH	%	25	31.6	25	23	25	31.6	25	23	25	31.6	25	23