

Appendix: Boiler KPIs – All Runs

KPI columns 1/4

run	param _ group	param _ value	fuel mass flow [kg/s]	air flow [kg/s]	excess air ratio [-]	feedwater flow [kg/s]	steam capacity [t/h]	eta direct [-]	eta indirect [-]
default_case	control		0.1	1.69026	1.05	1.89217	6.81335	0.945761	0.945761
drum_pressure_4.0bar	drum_pressure	4	0.1	1.69026	1.05	1.93638	6.97293	0.951746	0.951746
drum_pressure_10.0bar	drum_pressure	10	0.1	1.69026	1.05	1.89217	6.81335	0.945761	0.945761
drum_pressure_16.0bar	drum_pressure	16	0.1	1.69026	1.05	1.87266	6.74283	0.942282	0.942282
excess_air_1.0	excess_air	1	0.1	1.60977	1	1.89818	6.83583	0.948896	0.948896
excess_air_1.05	excess_air	1.05	0.1	1.69026	1.05	1.89217	6.81335	0.945761	0.945761
excess_air_1.1	excess_air	1.1	0.1	1.77075	1.1	1.8858	6.7905	0.942557	0.942557
excess_air_1.15	excess_air	1.15	0.1	1.85124	1.15	1.88027	6.76653	0.939278	0.939278
excess_air_1.2	excess_air	1.2	0.1	1.93173	1.2	1.87368	6.7427	0.935943	0.935943
excess_air_1.3	excess_air	1.3	0.1	2.0927	1.3	1.86019	6.69377	0.929098	0.929098
fouling_1	fouling	1	0.1	1.69026	1.05	1.89217	6.81335	0.945761	0.945761
fouling_5	fouling	5	0.1	1.69026	1.05	1.88795	6.79898	0.94375	0.94375
fouling_10	fouling	10	0.1	1.69026	1.05	1.88158	6.77559	0.940513	0.940513
fuel_flow_0.025kgs	fuel_flow	0.025	0.025	0.422565	1.05	0.477867	1.7229	0.956457	0.956457
fuel_flow_0.05kgs	fuel_flow	0.05	0.05	0.845131	1.05	0.954431	3.43788	0.95438	0.95438
fuel_flow_0.075kgs	fuel_flow	0.075	0.075	1.2677	1.05	1.42556	5.13406	0.950189	0.950189
fuel_flow_0.1kgs	fuel_flow	0.1	0.1	1.69026	1.05	1.89217	6.81335	0.945761	0.945761
fuel_flow_0.125kgs	fuel_flow	0.125	0.125	2.11283	1.05	2.35408	8.47728	0.941374	0.941374

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run	param _ group	param _ value	Stack loss fraction [-]	Q _ flue _ out [MW]	UA [MW/K]	Q _ in total [MW]	Q _ useful [MW]	Q _ balance _ error [MW]	pressure drop fric total [kPa]
default_case	control		0.0542386	0.25366	0.0105003	4.67675	4.42309	-0.000120622	-8.35417
drum_pressure_4.0bar	drum_pressure	4	0.0482544	0.225674	0.0103183	4.67675	4.45108	-0.000120623	-7.90743
drum_pressure_10.0bar	drum_pressure	10	0.0542386	0.25366	0.0105003	4.67675	4.42309	-0.000120622	-8.35417
drum_pressure_16.0bar	drum_pressure	16	0.0577177	0.269931	0.0106355	4.67675	4.40682	-0.000120622	-8.62182
excess_air_1.0	excess_air	1	0.0511038	0.238992	0.0103366	4.6766	4.43761	-0.000120313	-7.58097
excess_air_1.05	excess_air	1.05	0.0542386	0.25366	0.0105003	4.67675	4.42309	-0.000120622	-8.35417
excess_air_1.1	excess_air	1.1	0.057443	0.268655	0.0106391	4.6769	4.40824	-0.000120904	-9.17493
excess_air_1.15	excess_air	1.15	0.0607221	0.284	0.0107812	4.67705	4.39305	-0.000121165	-10.0454
excess_air_1.2	excess_air	1.2	0.0640575	0.29961	0.0109219	4.6772	4.37759	-0.000121404	-10.9667
excess_air_1.3	excess_air	1.3	0.0709018	0.331643	0.0111794	4.6775	4.34586	-0.000121822	-12.9711
fouling_1	fouling	1	0.0542386	0.25366	0.0105003	4.67675	4.42309	-0.000120622	-8.35417
fouling_5	fouling	5	0.0562497	0.263066	0.0100044	4.67675	4.41368	-0.000120628	-8.51203
fouling_10	fouling	10	0.0594867	0.278204	0.00940156	4.67675	4.39855	-0.000120609	-8.77456
fuel_flow_0.025kgs	fuel_flow	0.025	0.0435434	0.0509104	0.00374832	1.16919	1.11828	-3.01561e-05	-0.542363
fuel_flow_0.05kgs	fuel_flow	0.05	0.0456202	0.106677	0.00662273	2.33837	2.2317	-6.03094e-05	-2.02449
fuel_flow_0.075kgs	fuel_flow	0.075	0.0498112	0.174716	0.00868244	3.50756	3.33285	-9.04667e-05	-4.57141
fuel_flow_0.1kgs	fuel_flow	0.1	0.0542386	0.25366	0.0105003	4.67675	4.42309	-0.000120622	-8.35417
fuel_flow_0.125kgs	fuel_flow	0.125	0.0586258	0.342723	0.0121564	5.84594	5.50321	-0.000150773	-13.6466

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run	param _ group	param _ value	pressure drop minor total [kPa]	pressure drop total [kPa]	water pressure drop fric total [kPa]	water pressure drop minor total [kPa]	water pressure drop total [kPa]	LHV [kJ/kg]	P-LHV [MW]
default_case	control		-4.09237	-12.4465	-0.0559112	-0.000981025	-0.0568922	46731	4.6731
drum_pressure_4.0bar	drum_pressure	4	-3.89966	-11.8071	-0.0583874	-0.00102521	-0.0594126	46731	4.6731
drum_pressure_10.0bar	drum_pressure	10	-4.09237	-12.4465	-0.0559112	-0.000981025	-0.0568922	46731	4.6731
drum_pressure_16.0bar	drum_pressure	16	-4.20651	-12.8283	-0.0550437	-0.000962062	-0.0560058	46731	4.6731
excess_air_1.0	excess_air	1	-3.6978	-11.2788	-0.0561612	-0.000986843	-0.0571481	46731	4.6731
excess_air_1.05	excess_air	1.05	-4.09237	-12.4465	-0.0559112	-0.000981025	-0.0568922	46731	4.6731
excess_air_1.1	excess_air	1.1	-4.51307	-13.688	-0.0556276	-0.000974849	-0.0566025	46731	4.6731
excess_air_1.15	excess_air	1.15	-4.96132	-15.0067	-0.0554122	-0.000969562	-0.0563817	46731	4.6731
excess_air_1.2	excess_air	1.2	-5.43822	-16.405	-0.0551056	-0.000963195	-0.0560688	46731	4.6731
excess_air_1.3	excess_air	1.3	-6.48472	-19.4558	-0.0544629	-0.000950212	-0.0554131	46731	4.6731
fouling_1	fouling	1	-4.09237	-12.4465	-0.0559112	-0.000981025	-0.0568922	46731	4.6731
fouling_5	fouling	5	-4.16622	-12.6782	-0.0564279	-0.000977851	-0.0574058	46731	4.6731
fouling_10	fouling	10	-4.28569	-13.0603	-0.0573099	-0.00097325	-0.0582832	46731	4.6731
fuel_flow_0.025kgs	fuel_flow	0.025	-0.225954	-0.768317	-0.00855037	-6.25129e-05	-0.00861288	46731	1.16827
fuel_flow_0.05kgs	fuel_flow	0.05	-0.92787	-2.95236	-0.0170261	-0.000249509	-0.0172756	46731	2.33655
fuel_flow_0.075kgs	fuel_flow	0.075	-2.18072	-6.75214	-0.0272303	-0.000556733	-0.0277871	46731	3.50482
fuel_flow_0.1kgs	fuel_flow	0.1	-4.09237	-12.4465	-0.0559112	-0.000981025	-0.0568922	46731	4.6731
fuel_flow_0.125kgs	fuel_flow	0.125	-6.84049	-20.4871	-0.107079	-0.00151877	-0.108598	46731	5.84137

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run	param _ group	param _ value	Tad [°C]	stack temperature [°C]	feedwater pressure [kPa]	drum pressure [kPa]
default_case	control		1981.5	152.384	1000.06	1000
drum_pressure_4.0bar	drum_pressure	4	1981.5	138.492	400.059	400
drum_pressure_10.0bar	drum_pressure	10	1981.5	152.384	1000.06	1000
drum_pressure_16.0bar	drum_pressure	16	1981.5	160.44	1600.06	1600
excess_air_1.0	excess_air	1	2052.36	150.157	1000.06	1000
excess_air_1.05	excess_air	1.05	1981.5	152.384	1000.06	1000
excess_air_1.1	excess_air	1.1	1915.54	154.591	1000.06	1000
excess_air_1.15	excess_air	1.15	1854.03	156.792	1000.06	1000
excess_air_1.2	excess_air	1.2	1796.53	158.95	1000.06	1000
excess_air_1.3	excess_air	1.3	1692.05	163.161	1000.06	1000
fouling_1	fouling	1	1981.5	152.384	1000.06	1000
fouling_5	fouling	5	1981.5	157.043	1000.06	1000
fouling_10	fouling	10	1981.5	164.531	1000.06	1000
fuel_flow_0.025kgs	fuel_flow	0.025	1981.5	127.526	1000.01	1000
fuel_flow_0.05kgs	fuel_flow	0.05	1981.5	132.364	1000.02	1000
fuel_flow_0.075kgs	fuel_flow	0.075	1981.5	142.11	1000.03	1000
fuel_flow_0.1kgs	fuel_flow	0.1	1981.5	152.384	1000.06	1000
fuel_flow_0.125kgs	fuel_flow	0.125	1981.5	162.541	1000.11	1000