

ADI-NOx

ADI Premix Combustion Gas Fired Boilers



Ultra low emission, compact gas fired boilers
in condensing and non-condensing versions
with outputs from 68 to 905kW

MHS
BOILERS
Part of elco heating solutions

Kinder to the environment

High efficiency accords reduced carbon emissions, and extremely low NOx concentration in the flue gases reduces the potential for damage to the environment through acid rain.

Utilising a radiant premix burner fed with precisely premixed gas and air, the ADI-NOx ADI range of boilers have extremely low harmful emissions with NOx as low as 4.0mg/kWh at 0% O₂.

The ADI boilers are available in three different forms, condensing versions for highest efficiency, low temperature versions for higher output and standard versions which are designed with the replacement boiler market in mind where compact dimensions and the ability to operate at 11°C Δt system design conditions are key features.

ADI boilers are designed to operate with a Δt between 10 to 15K, however for installations where a wider system load circuit temperature drop is desired, this is simply achieved via temperature modification through blending in the low loss header. For rationale see page 14.

The compact dimensions of the ADI boilers allow important space to be liberated for other purposes in new build projects. And when used as replacement appliances in existing buildings, the space saving nature of these boilers makes for ease of application, with even the possibility to make an almost complete installation of the boilers as replacements, before the original units are taken out of service. Thus reducing the time needed to bring the system back to operation

and thereby reducing inconvenience in a building that remains occupied during the works.

Boiler replacement can pose extreme difficulties, particularly when attempting to retrofit for some of the very narrow dimensioned gas fired atmospheric appliances which were very popular during the period from the 1970's to the early 2000's. Some appliances with outputs up to 100kW were just 376mm wide. The ADI boilers provide the solution with models of up to 110kW output which are only 350mm wide.

Modulating burner output with turndown to 30% of maximum output and the ability to create cascade/modular installations of up to 15 boilers gives the potential for extremely high seasonal efficiency.



Put your mind at rest

It's easy to ignore your boiler and heating system - until it goes wrong or breaks down. A system failure, especially one caused by lack of maintenance, can be inconvenient and costly.

It isn't hard to imagine the difficulties that problems with your heating system can cause. And in some situations lack of heating and hot water can be critical. Similar to your car, a regularly maintained heating system will run more efficiently and any potential problems can be resolved before they develop into major system failure. Financially, planned maintenance makes sense too. It avoids major capital outlay and the associated costs of system down time - plus it can keep your fuel costs down as well as ensuring you are minimising your emissions.

At MHS Boilers we provide a lifetime maintenance and service solution for your heating system - enabling you to rest safe in the knowledge that we'll take care of it.

Please contact our service department and we will be delighted to arrange a quotation:

Tel : 01268 546770 or e-mail: service@mhsboilers.co.uk



Our highly skilled and trained service and technical support engineers are only a phone call away

Standard features

Durability

Through the use of corrosion resistant stainless steel as a heat exchanger material in the CD and LT models. The HT models being non-condensing appliances are fabricated from high quality carbon steel.

Compact dimensions

Mindful that space is at a premium in commercial buildings, the ADI has been designed to be space-saving and with dimensions as small as 350mm wide for outputs up to 105kW and just 1040mm width for a boiler of 905kW output, the appliances are ideal first time or replacement units.

Controls

Communication between the user and the boiler's in-built comprehensive control centre is via LCD interface with soft touch membrane switches and which provides at-a-glance information about the operation of the appliance. Programming is via menu based format. As standard the boiler can control an attached heating circuit (which may be with direct-on-boiler weather compensation for the CD and LT versions) plus a domestic hot water cylinder.

Extreme efficiency

Up to 99.3% net at full load is achievable utilising the condensing version (CD).

Multiple boiler installations

With the use of an RVA47 cascade manager, up to 12 boilers may be controlled with optimum power to load matching for good seasonal efficiency. Alternatively, the use of an RVS 63 controller provides for cascade installations of up to 15 boilers.

Analog input

If required, a single boiler or a cascade arrangement may be set up to respond to variable voltage inputs. Alternatively, boilers may be enabled by an external volt free switch.

Warranty

As standard the warranty period is 2 years. All guarantees are against manufacturing or material defects only (see terms and conditions of sale).



For details on prefabricated skid mounted sets or roof-top packages, please contact MHS Boilers

Range overview

ADI-NO_x ADI HT

With outputs from 104 to 905kW, the HT range are compact high output standard type premix combustion boilers fabricated from carbon steel with gross seasonal efficiency of not less 86.6% making them suitable for new and existing buildings projects. Particularly suited to replacement works where the original system design conditions were based upon 82/71°C flow/return temperatures.

ADI-NO_x ADI CD

With outputs from 68 to 905kW, the CD range are compact high output fully modulating condensing type premix combustion boilers fabricated from stainless steel. Their ability to operate on systems with narrow Δt makes them ideally suited to use with underfloor heating systems or systems that have been designed using traditional UK system design parameters. The gross seasonal efficiency of the CD boilers is not less than 92.59%.

ADI-NO_x ADI LT

With outputs from 104 to 905kW, the LT range are compact high output low temperature type modulating premix combustion boilers, fabricated from stainless steel with gross seasonal efficiency of not less 92.3% making them suitable for new and existing buildings projects. Particularly suited to projects where a condensing boiler is not strictly required but the return water temperature may be below the dew point temperature of the flue gases at times, and there may be some flue gas condensation produced.



Dimensions & clearances

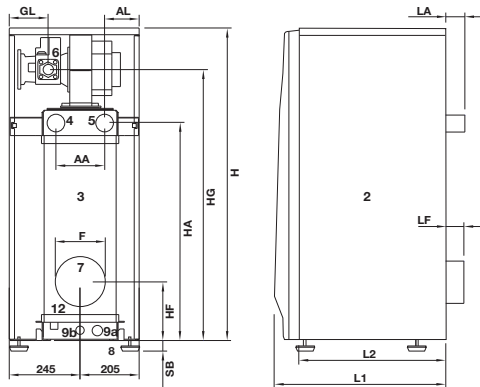
ADI-NOx ADI Models		Connections			
LT & HT	CD	4/5	6	9	12
-	70	2"BSP-M	¾"	¾"	½"
-	85	2"BSP-M	¾"	¾"	½"
105	105	2"BSP-M	¾"	¾"	½"
130	120	2"BSP-M	1"	¾"	½"
150	-	2"BSP-M	1"	¾"	½"
200	-	2"BSP-M	1"	¾"	½"
-	175	2"BSP-M	1"	¾"	½"
-	200	PN6 DN65	1¼"	1½"	½"
250	250	PN6 DN65	1¼"	1½"	½"
275	-	PN6 DN65	1¼"	1½"	½"
325	325	PN6 DN65	1¼"	1½"	½"
400	375	PN6 DN65	1¼"	1½"	½"
475	450	PN6 DN65	1¼"	1½"	½"
550	550	PN6 DN100	1¼"	1½"	½"
650	650	PN6 DN100	1¼"	1½"	½"
750	750	PN10 DN100	1¼"	1½"	½"
850	850	PN10 DN100	1¼"	1½"	½"
950	950	PN10 DN100	1¼"	1½"	½"

Legend	Item
1	Boiler front view
2	Boiler side view
3	Boiler rear view
4	Flow connection
5	Return connection
6	Gas connection
7	Flue outlet
8	Anti-vibration supports
9	Drain connection
12	Condense waste outlet

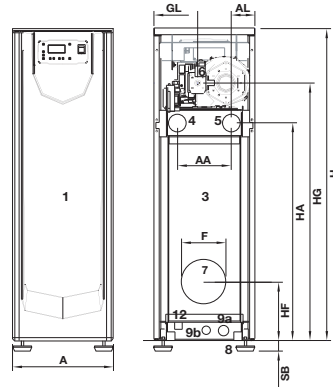
Models ADI-NOx ADI		Dimensions mm												
LT & HT	CD	A	AA	AL	F(7)	H*	HA*	HF*	HG*	L1	L2	LA	LF	GL
-	70	350	185	82.5	150	1110	774	208	915	595	510	66	62	151.5
-	85	350	185	82.5	150	1110	774	208	915	615	510	66	62	151.5
-	105	350	185	82.5	150	1110	774	208	915	635	510	66	62	151.5
105	-	350	185	82.5	150	1110	774	198	915	635	510	66	62	151.5
-	120	450	185	112.5	150	1110	774	198	963	635	530	66	62	134.3
130	-	450	185	112.5	150	1110	774	198	963	595	510	66	62	134.3
150	-	450	185	112.5	150	1110	774	198	963	615	510	66	62	134.3
-	175	450	185	112.5	150	1110	774	198	963	655	570	66	62	134.3
-	200	660	305	177.5	175	1583	937	403	1156	940	775	61	75	217.3
200	-	450	185	112.5	150	1110	774	198	963	635	546	66	62	134.3
250	250	660	305	177.5	175	1583	937	403	1156	940	775	61	75	217.3
275	-	660	305	177.5	175	1583	937	403	1156	940	775	61	75	217.3
325	325	810	360	225	250	1583	936	445	1156	940	775	61	75	292
-	375	810	360	225	250	1583	936	445	1190	940	775	61	75	249.3
400	-	810	360	225	250	1583	936	445	1190	940	775	61	75	249.3
-	450	810	360	225	250	1583	936	445	1190	940	775	61	75	249.3
475	-	810	360	225	250	1583	936	445	1190	940	775	61	75	249.3
550	-	1040	380	320	350	1583	1026	443	1341	940	775	63	69	359
-	550	1040	400	320	350	1583	1022	443	1365	940	775	63	69	360
-	650	1040	400	320	350	1583	1022	443	1365	940	775	63	69	360
650	-	1040	380	320	350	1583	1026	443	1341	940	775	63	69	359
750	750	1040	400	320	350	1583	1022	443	1365	940	775	63	69	360
850	850	1040	400	330	350	1583	1022	443	1365	1160	995	93	-	360
950	950	1040	400	330	350	1583	1022	443	1365	1160	995	93	-	360

* Height dimensions H,HG,HA and HF do not take into account the additional dimension "SB" of the adjustable silent-block feet - nominally 25mm (adjustment range 25-40mm).

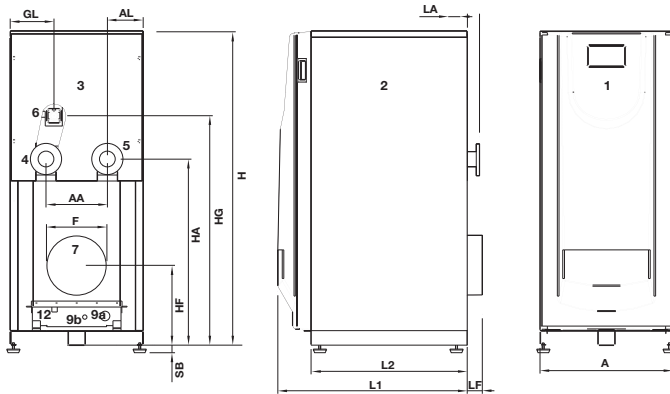
Models CD120 & HT/LT 130 - 200



Models CD70 - 105 & HT/LT 105



Models CD175 - 450 & HT/LT 250 - 475



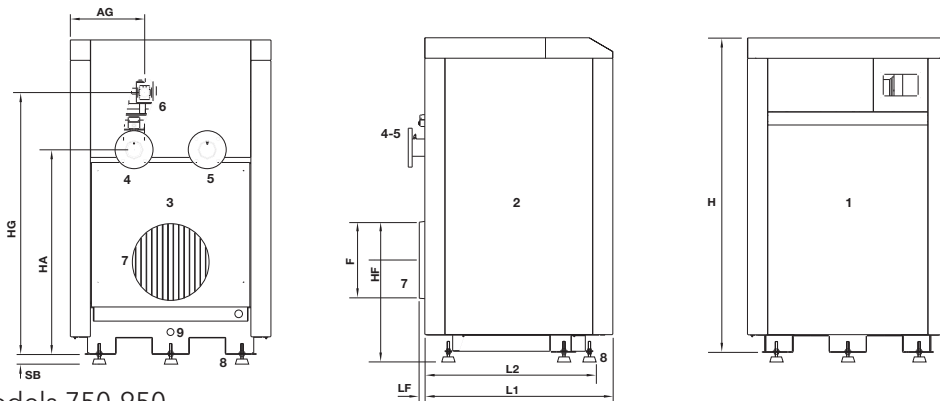
Clearances

Front - 1000mm. Rear - as necessary to make connections and flue coupling, suggested minimum 1000mm.

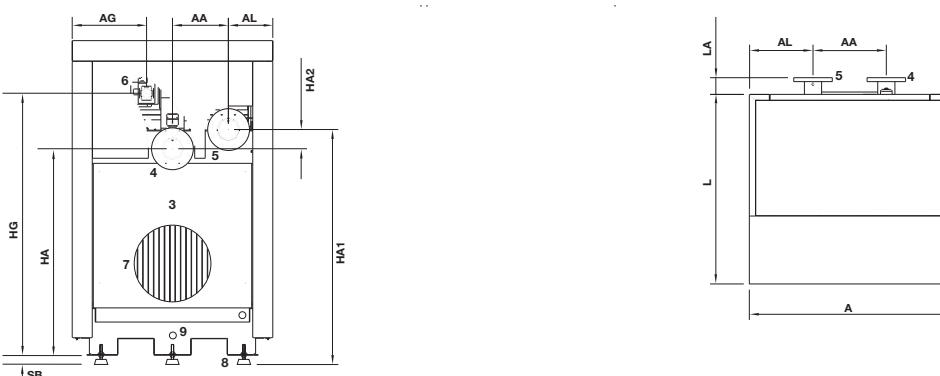
Sides - min 25 mm required but it is recommended to allow at least 450mm at one side of the boiler or group of boilers to give access to the rear for connections access.

Above - not exceeding 500mm (see installer guide for specific details).

All models 550-650



All models 750-950



Technical data ADI HT Models

Model		HT	HT	HT	HT	HT	HT	HT	HT	HT	HT	HT	HT	HT	HT	
ADI-NOx ADI		105	130	150	200	250	275	325	400	475	550	650	750	850	950	
Nominal heat output max @ mean water temp 70°C	kW	104	130	150	190	230	262	322	380	464	545	616	695	804	905	
Nominal heat output min @ mean water temp 70°C	kW	31.2	39	45	57	69	78.6	96.6	114	139.2	218	246.4	278	321.6	362	
Nominal heat input max (net)	kW	109.6	138	157.2	200	242.3	270	334	396	483.3	569.2	643.4	723	829	942.7	
Nominal heat input min (net)	kW	32.9	41.4	47.2	60	72.7	81	100.2	118.8	145	227.7	257.4	289.2	331.6	377.1	
Gross seasonal efficiency*	%	87.04	86.63	87.05	87.41	86.82	88.77	88.17	87.68	87.7	87.5	87.5	87.57	87.50	87.50	
Modulation range	%	100% - 30%									100% - 40%					
Maximum flow temperature	°C	90														
Minimum return temperature	°C	60														
Water content	litres	30	30	33	36	76	85	99	106	112	160	160	160	188	188	
Nominal water flow Δt 10K	l/s	2.47	3.09	3.57	4.52	5.47	6.23	7.66	9.04	11.04	12.97	14.66	16.54	19.04	21.54	
Nominal water flow Δt 11K	l/s	2.25	2.81	3.24	4.11	4.97	5.67	6.96	8.22	10.04	11.79	13.33	15.04	17.31	19.58	
Nominal water flow Δt 15K (min flow)	l/s	1.65	2.06	2.38	3.01	3.65	4.15	5.11	6.03	7.36	8.65	9.77	11.03	12.69	14.36	
Hydraulic resistance @ Δt 10K	kPa	9.5	11.8	12.8	15	17.7	13.7	16.3	18.9	23.6	16.1	19.6	19	18.0	24.0	
Hydraulic resistance @ Δt 11K	kPa	7.88	9.75	10.57	12.4	14.62	11.32	13.47	15.61	19.5	13.3	16.19	15.7	16.0	20.0	
Hydraulic resistance @ Δt 15K	kPa	3.54	4.4	4.77	5.59	6.6	5.11	6.08	7.05	8.8	6	7.31	7.08	8.0	10.5	
Minimum return temperature protection shunt recirculation flow rate	l/s	1	1.25	1.43	1.65	2.2	2.5	2.8	3.3	4.4	5.2	5.85	6.6	7.59	8.59	
Min/max water pressure	bar	1.0/5.0														
Gas consumption NG (G20)	m³/h	10.2	12.8	14.6	18.6	22.5	25.1	31	36.8	44.9	52.4	59.3	67.0	77.1	87.6	
Nom gas inlet pressure NG (min/max)	mbar	20 (17/45)														
Gas consumption LPG (G31)	kg/h	2.7	3.4	3.9	5.0	6.0	6.7	8.3	9.8	12.0	18.6	-	-	-	-	
Nom gas inlet pressure LPG	mbar	37														
Approx flue gas volume	m³/h	238	300	341	434	550	614	759	899	1098	1170	1321	1491	1771	2014	
Residual pressure @ flue outlet	Pa	18.9	64.8	90	67.5	54	70.8	90	90	90	180	132	108	180	270	
NOx emission @ 0% O ₂	mg/kWh	<21.0														
Approx flue gas temperature	°C	115														
Gas connection	BSP-F	¾"	1"	1"	1"	1 ¼"	1 ¼"	1 ¼"	1 ¼"	1 ¼"	1 ¼"	1 ¼"	1 ¼"	1 ¼"	1 ¼"	
Flow/return connections (•BSP-M)	DN	•2"	•2"	•2"	•2"	65 PN6	65 PN6	65 PN6	65 PN6	65 PN6	100 PN6	100 PN6	100 PN10	100 PN10	100 PN10	
Flue connection	Ø mm	150	150	150	150	175	175	250	250	250	350	350	350	350	350	
Nominal weight (dry)	kg	110	110	112	123	139	330	350	440	490	490	500	500	500	585	
Noise level @ 1m distance	dB(A)	69.6	68.8	71.2	66.7	70.0	62.9	70.2	74.8	78.0	67.9	68.8	71.2	74.3	78.2	
Electrical supply	v/ph	230V single phase 50Hz													400V 3ph	
Power consumption (max)	W	255	268	282	256	314	259	342	445	727	668	859	1165	1300	1800	

* Calculated using "Equation 2^o" as listed in the Non-Domestic Building Services Compliance Guide

- Models 650 to 950 not available for use with LPG

Technical data ADI LT Models

Model		LT	LT	LT	LT	LT	LT	LT	LT	LT	LT	LT	LT	LT	LT	
ADI-NOx ADI		105	130	150	200	250	275	325	400	475	550	650	750	850	950	
Nominal heat output max @ mean water temp 70°C	kW	104	130	149.3	190	230	262	322	380	464	545	616	695	804	905	
Nominal heat output min @ mean water temp 70°C	kW	31.2	39	4.8	57	69	78.6	96.6	114	139.2	218	246.4	278	321.6	362	
Nominal heat input max (net)	kW	109.6	138	157.2	200	242.3	270	334	396	483.3	569.2	643.4	723	829	942.7	
Nominal heat input min (net)	kW	32.9	41.4	47.2	60	72.7	81	100.2	118.8	145	225.4	255.3	288.1	331.6	377.1	
Gross seasonal efficiency*	%	92.59	92.45	92.62	92.64	92.55	92.88	92.9	92.84	92.84	92.74	92.74	92.81	92.8	92.65	
Modulation range	%	100% - 30%									100% - 40%					
Maximum flow temperature	°C	90														
Water content	litres	30	30	33	36	76	85	99	106	112	160	160	160	188	188	
Nominal water flow Δt 10K	l/s	2.47	3.09	3.57	4.52	5.47	6.23	7.66	9.04	11.04	12.97	14.66	16.54	19.04	21.54	
Nominal water flow Δt 11K	l/s	2.25	2.81	3.24	4.11	4.97	5.67	6.96	8.22	10.04	11.79	13.33	15.04	17.31	19.58	
Nominal water flow Δt 15K (min flow)	l/s	1.65	2.06	2.38	3.01	3.65	4.15	5.11	6.03	7.36	8.65	9.77	11.03	12.69	14.36	
Hydraulic resistance @ Δt 10K	kPa	4.5	5.8	7.8	9.1	11.7	13.7	8.8	11.7	16.3	16.1	19.6	19	18.0	24.0	
Hydraulic resistance @ Δt 11K	kPa	3.73	4.81	6.46	7.54	9.7	11.36	7.29	9.7	13.52	13.3	16.19	15.7	16.0	20.0	
Hydraulic resistance @ Δt 15K	kPa	1.7	2.2	2.9	3.4	4.4	5.1	3.3	4.4	6.1	6	7.31	7.08	8.0	10.5	
Min/max water pressure	bar	1.0/5.0														
Gas consumption NG (G20)	m³/h	10.2	12.8	14.6	18.6	22.5	25.1	31	36.8	44.9	52.4	59.3	67.0	77.1	87.6	
Nom gas inlet pressure NG (min/max)	mbar	20 (17/45)														
Gas consumption LPG (G31)	kg/h	2.7	3.4	3.9	5.0	6.0	6.7	8.3	9.8	12.0	18.6	-	-	-	-	
Nom gas inlet pressure LPG	mbar	37.0														
Approx flue gas volume	m³/h	238	300	341	434	550	614	759	899	1098	1170	1321	1491	1771	2014	
Residual pressure @ flue outlet	Pa	18.9	64.8	90	67.5	54	70.8	90	90	90	180	132	108	180	270	
NOx emission @ 0% O ₂	mg/kWh	<21.0														
Approx flue gas temperature @ mean water temp 40/70°C	°C	50/80														
Gas connection	BSP-F	¾"	1"	1"	1"	1 ¼"	1 ¼"	1 ¼"	1 ¼"	1 ¼"	1 ¼"	1 ¼"	1 ¼"	1 ¼"	1 ¼"	
Flow/return connections (•BSP-M)	DN	•2"	•2"	•2"	•2"	65 PN6	65 PN6	65 PN6	65 PN6	65 PN6	100 PN6	100 PN6	100 PN10	100 PN10	100 PN10	
Flue connection	Ø mm	150	150	150	150	175	175	250	250	250	350	350	350	350	350	
Nominal weight (dry)	kg	110	110	112	123	139	330	350	440	490	490	500	500	500	585	
Noise level @ 1m distance	dB(A)	69.6	68.8	71.2	66.7	62.2	62.9	62.9	66.8	69.0	67.0	68.0	69.7	74.3	78.2	
Electrical supply	v/ph	230V single phase 50Hz												400V 3ph		
Power consumption (max)	W	255	268	282	256	314	259	342	346	389	800	820	1042	1300	1800	

* Calculated using "Equation 2⁹" as listed in the Non-Domestic Building Services Compliance Guide

- Models 650 to 950 not available for use with LPG

Technical data ADI CD Models

Model		CD	CD	CD	CD	CD	CD	CD	CD	CD	CD	CD	CD	CD	CD	CD
ADI-NOx ADI		70	85	105	120	175	200	250	325	375	450	550	650	750	850	950
Nominal heat output max @ mean water temp 70°C	kW	68	85	104	120	161.8	197.5	241	294	354	440	530	598	675	792.7	892.3
Nominal heat output min @ mean water temp 70°C	kW	20.4	25.5	31.2	36	48.5	59.25	72.3	88.2	106.2	132	212	239.2	270	317	356.9
Nominal heat output max @ mean water temp 40°C	kW	68.7	86.1	105.6	121.3	167.1	204.5	244.7	302.6	358.7	443.5	542.1	610.3	686.8	802.1	904.1
Nominal heat output min @ mean water temp 40°C	kW	22	27.5	34	39	52.3	63.1	77.4	94.4	113.6	141	230	259	292	338.2	380.9
Nominal heat input max (net)	kW	70	87.7	107.1	123.4	166	202.2	246.5	300.5	361.2	448.2	548.1	619	695.8	818.5	924.5
Nominal heat input min (net)	kW	21	26.3	32.2	37	49.8	60.7	74	90.2	108.4	134.5	219.2	247.6	278.3	332	377
Gross seasonal efficiency*	%	93.08	92.86	93.16	93.32	92.59	92.63	93.11	93.16	93.28	93.27	92.9	92.88	92.95	92.95	92.95
Modulation range	%	100% - 30%										100% - 40%				
Maximum flow temperature	°C	90														
Water content	litres	30	33	34	34	35	86	90	112	118	118	160	160	160	188	188
Nominal water flow Δt 10K	l/s	1.61	2.02	2.47	2.85	3.85	4.7	5.73	7	8.42	10.47	12.61	14.23	16.07	19.04	21.54
Nominal water flow Δt 11K	l/s	1.46	1.84	2.24	2.59	3.5	4.28	5.21	6.37	7.67	9.53	11.48	12.96	14.63	17.31	19.58
Nominal water flow Δt 15K (min flow)	l/s	1.07	1.35	1.64	1.9	2.56	3.13	3.82	4.67	5.62	6.98	8.41	9.5	10.72	12.69	14.36
Hydraulic resistance @ Δt 10K	kPa	8.5	9	9.7	10.3	8.4	9.4	11	12.5	14.8	18.2	11.7	13.7	15	18.0	24.0
Hydraulic resistance @ Δt 11K	kPa	7.04	7.45	8.04	8.53	6.96	7.8	9.11	10.36	12.26	15.08	9.7	11.35	12.43	16.0	20.0
Hydraulic resistance @ Δt 15K	kPa	3.2	3.39	3.66	3.88	3.17	3.55	4.15	4.72	5.58	6.87	4.42	5.17	5.66	8.0	10.5
Min/max water pressure	bar	1.0/5.0														
Gas consumption NG (G20)	m³/h	6.5	8.2	10	11.5	15.4	18.8	22.9	27.9	33.6	41.7	51	57.5	64.7	77.1	87.6
Nom gas inlet pressure NG (min/max)	mbar	20 (17/45)														
Gas consumption LPG (G31)	kg/h	1.7	2.2	2.7	3.1	4.1	5.0	6.1	7.4	8.9	11.1	18.0	-	-	-	-
Nom gas inlet pressure LPG	mbar	37.0														
Approx flue gas volume	m³/h	152	190	233	269	377	459	560	683	821	1018	1170	1321	1491	1771	2014
Residual pressure @ flue outlet	Pa	43.2	37.8	90	64.8	54	64.8	64.8	90	64.8	90	180	132	108	177.5	266.2
NOx emission @ 0% O ₂	mg/kWh	<12.0														
Approx flue gas temperature @ mean water temp 40/70°C	°C	45/75														
Gas connection	BSP-F	¾"	¾"	¾"	1"	1"	1 ¼"	1 ¼"	1 ¼"	1 ¼"	1 ¼"	1 ¼"	1 ¼"	1 ¼"	1 ¼"	1 ¼"
Flow/return connections (*BSP-M)	DN	•2"	•2"	•2"	•2"	•2"	65 PN6	65 PN6	65 PN6	65 PN6	65 PN6	100 PN6	100 PN6	100 PN10	100 PN10	100 PN10
Flue connection	Ø mm	150	150	150	150	150	175	175	250	250	250	350	350	350	350	350
Nominal weight (dry)	kg	110	116	120	135	138	330	350	440	445	490	510	510	510	585	585
Noise level @ 1m distance	dB(A)	62.8	64.7	68.8	65.5	59.2	66.7	61.4	62.0	67.6	70.4	65.9	67.7	69.2	74.1	78.0
Electrical supply	v/ph	230V single phase 50Hz													400V 3ph	
Power consumption (max)	W	236	240	255	245	267	261	290	334	301	768	77	789	1003	1300	1800

* Calculated using "Equation 2⁹" as listed in the Non-Domestic Building Services Compliance Guide

- Models 650 to 950 not available for use with LPG

Control Options

ADI-NOx ADI Boilers can be used singly or in multiple/modular configurations of up to 15 boilers.

A single boiler may be enabled by a remote volt free contact or remotely modulated via 0-10Vdc analogue signal. An optional extra "Clip-in module AGU2.510A109" will be required for remote control by 0-10V.

BMS Volt Free Alarm: Another function of the AGU2.510A109 Clip-in module is the facility of a volt free alarm contact to indicate to a fault status to a remote point.

Multiple Boiler Cascade Managers: For the control of up to 12 boilers (RVA47) or 15 boilers (RVS63) Cascade Managers are available which provide modulating control of all of the connected boilers for efficient control of the boiler power relative to current load. The cascade managers also provide zone control for heating circuits and a hot water cylinder. When using cascade controllers, each boiler must be fitted with an OCI 420 Clip-in module for communication via the LPB Bus.

Water Quality

The water system must be cleansed and flushed and treated with a good quality scale and corrosion inhibitor. If the boilers are being used as replacement appliances onto an existing system, adequate measures must be taken to protect the new boilers from the effects of sludge and debris that may be accumulated in the old system via the use of a filter system or dirt separator etc. Alternatively, consideration should be given to hydraulic separation of the new boilers from the existing system via the use of a plate type heat exchanger.

Each boiler must have a coarse strainer installed into the return pipe.

The filling and refilling water must have the following characteristics:

Total hardness (TH)	<1.2mmol/litre
pH	9.6 - 10
Resistivity	>2000 Ohms x cm
Salinity	<50mg/litre
Conductivity	<500µS/cm
Iron	<1mg/litre

Installation requirements

ADI-NOx ADI Boilers should be installed in accordance with the boiler installation instructions, the relevant requirements of the Building Regulations, Health & Safety Regulation PM5, Current edition of the IEE Regulations, Gas Safety(Installation and Use) Regulations, Water Regulations.

Codes of practice

The following list of codes of practice give guidance on the requirements for system design and installation.

BS 6644:2005

Specification for installation of gas-fired hot water boilers of rated inputs of between 70kW (net) and 1.8 MW (net) (2nd and 3rd family gases)

BS 6880-1: 1988

Code of practice for low temperature hot water heating systems of output greater than 45 kW.
Fundamental and design considerations

BS 6880-2: 1988

Code of practice for low temperature hot water heating systems of output greater than 45 kW.
Selection of equipment

BS 6880-3: 1988

Code of practice for low temperature hot water heating systems of output greater than 45 kW.
Installation, commissioning and maintenance

BS EN 12828:2003

Heating systems in buildings. Design for water-based heating systems

IGE/UP/2 Gas installation pipework and compressors on industrial and commercial premises.

IGE/UP/10 Installation of gas appliances in industrial and commercial premises, Part 1: Flued appliances.

CIBSE Guide Reference sections B7, B11 and B13

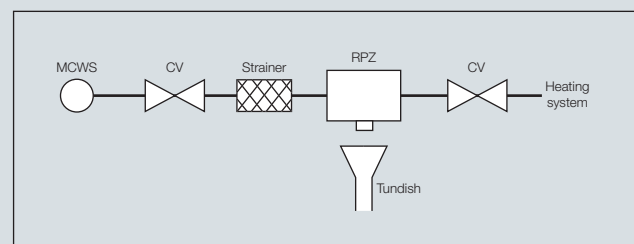
Filling the system

The initial filling of a sealed heating system and subsequent refilling must be by a method that has been approved by the Water Regulations Advisory Scheme (WRAS) for the type of heating system, i.e. Non Domestic (other than in-house) Fluid Category 4 (C4).

For Category 4 systems

The approved method of filling must comprise of the following components in the arrangement shown;

- Control Valve, on the Mains Cold Water pipework.
- Strainer.
- Verifiable Backflow Device with Reduced Pressure Zone (RPZ Valve) Incorporating a 'Type BA' air gap.
- Tundish
- Control Valve, on the Heating System pipework.

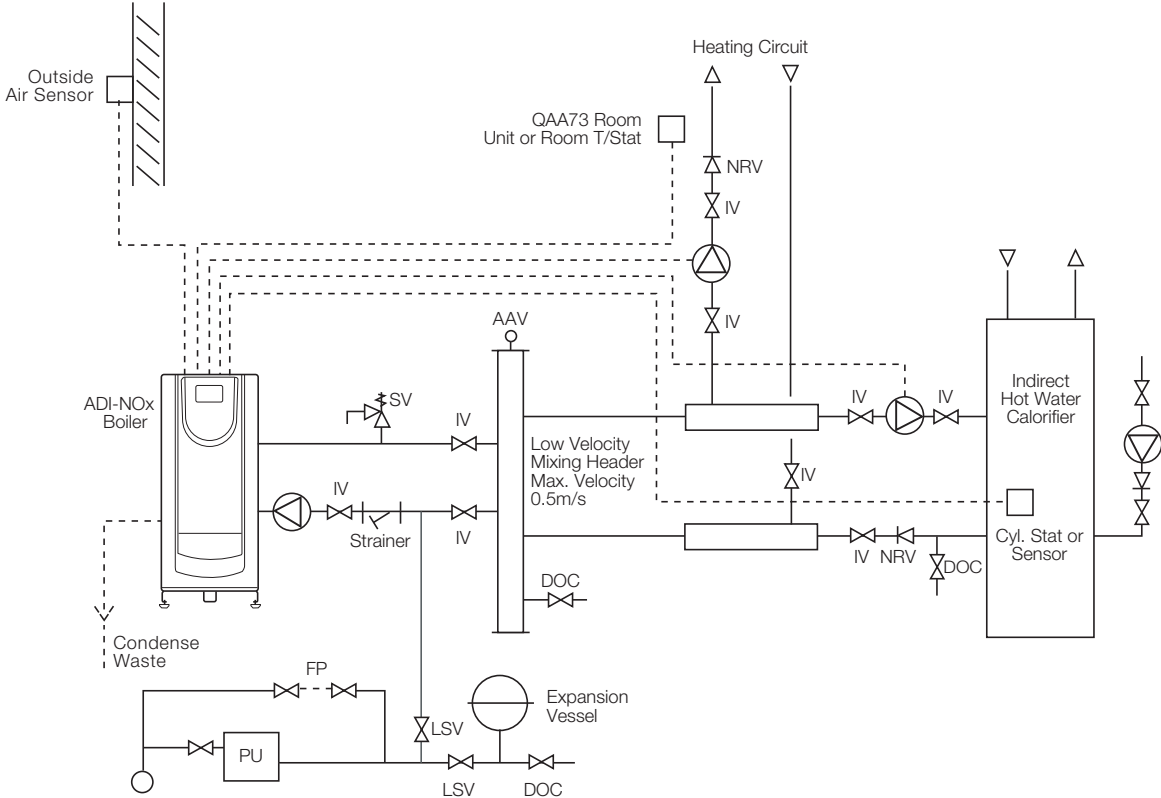


Hydraulic system design

ADI-NOx ADI Boilers can be used singly or in multiple/modular configurations of up to 12 boilers.

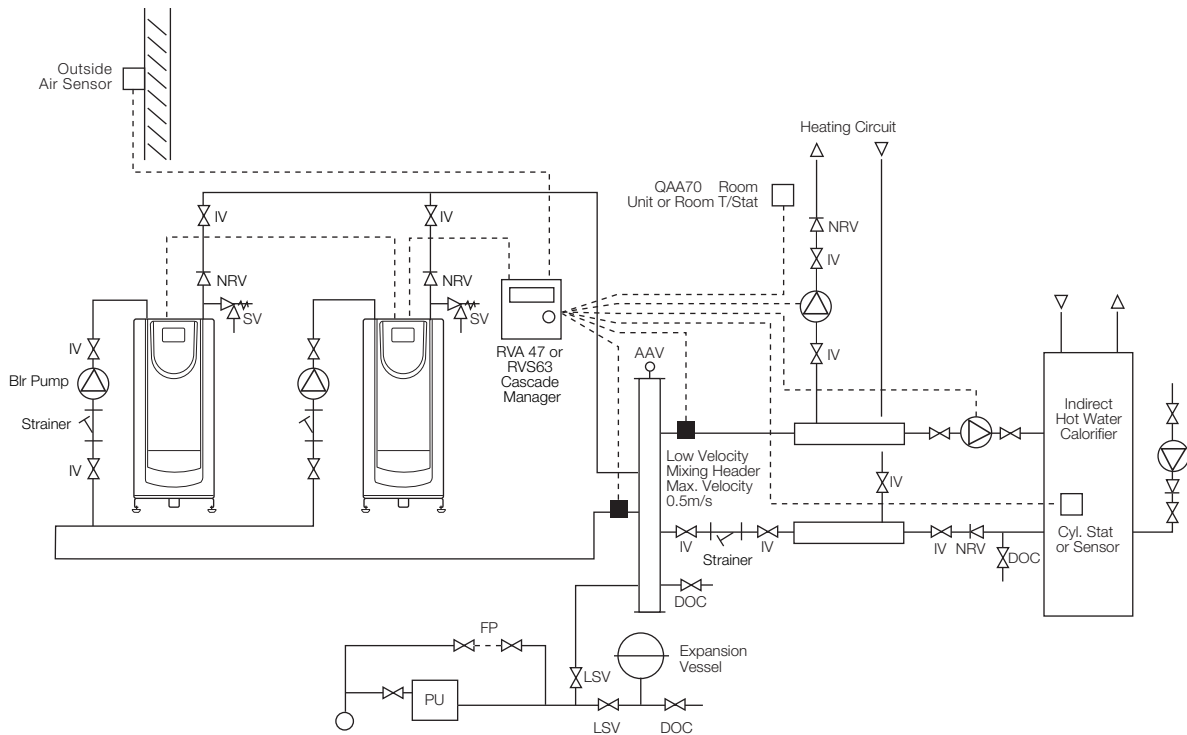
System schematics

Typical single boiler installation

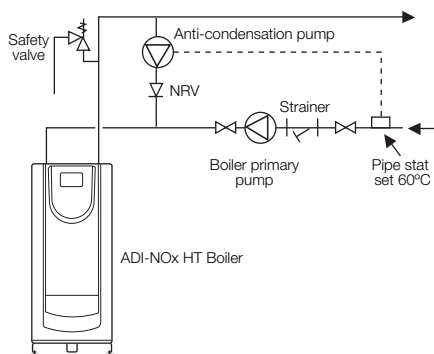


Hydraulic system design

Typical multi-boiler installation



Typical back-end temperature protection arrangement - HT model boilers



Rationale for modifying operational delta t when using CD or LT Boilers on systems with wide design temperature drop.

Ensure that the low loss header has a bore size that ensures a water velocity of not greater than 0.5m/s when handling the boiler/s design mass flow rate.

Example: System design temperatures 80/60°C.

Boiler/s operating at 80/70°C will have a mass flow rate of twice the flow rate that is circulating around the attached heating system. 50% of the mass flow rate of the boilers (at flow temperature 80°C) will recirculate within the low loss header and blend with the system return temperature (at 60°C) and elevate to the boiler operational return temperature of 70°C.

Other system operational temperature conditions can be accommodated by employing similar rationale and ensuring that the boiler/s are operated at the wanted system flow temperature. For example; system conditions 60/30°C. Boiler/s operating at 60/45°C will have a mass flow rate of twice the flow rate that is circulating around the attached heating system. 50% of the mass flow rate of the boilers (at flow temperature 60°C) will recirculate within the low loss header and blend with the system return temperature (at 30°C) and elevate to the boiler operational return temperature of 45°C.

System inertial water volume

When designing the hydraulic system to which ADI-NOx boilers are to be connected, it is important to ensure that a certain minimum system water volume (inertial volume) is always available to the boiler(s) under all operating conditions.

In other words, there is a certain minimum (continuously circulating) system water content that must be available to the boiler(s) whenever it is (they are) operating. If it is considered necessary to increase the inertial volume of a system then this may be done for example, by increasing the dimensions of the low loss header to increase its capacity. The water capacity of the boiler/s must not be taken into account in the calculations of the system inertial volume.

Flue gas temperatures

Model ADI-NOx ADI CD		
Average boiler water temperature °C	Flue gas temperature (°C) with burner operating at:	
	Minimum power 30%	Maximum power 100%
40	Between return temp and 40°C	40-50°C
70	Water return temperature	70-80°C

Model ADI-NOx ADI LT		
Average boiler water temperature °C	Flue gas temperature (°C) with burner operating at:	
	Minimum power 30%	Maximum power 100%
40	Between return temp and 40°C	40-50°C
70	Water return temperature	70-80°C

Model ADI-NOx ADI HT		
Average boiler water temperature °C	Flue gas temperature (°C) with burner operating at:	
	Minimum power 30%	Maximum power 100%
70	Approx 105°C	Approx 115°C

System inertial volumes

ADI-NOx Boiler Models	No of Boilers			
	1	2	3 - 4	
HT/LT	CD	Inertial Volume Litres		
-	70	13	20	26
-	85	17	26	34
105	105	20	30	40
130	120	32	45	65
150	175	35	55	80
200	200	55	85	120
250	250	35	40	55
275	-	40	45	75
325	325	55	65	100
400	375	75	100	150
475	450	105	155	220
550	550	70	100	150
650	650	105	165	200
750	750	135	210	300
850	850	180	270	400
950	950	220	330	500

Examples of flue systems

The flue system serving ADI-NOx Boilers must be designed to completely evacuate the volume of flue gases taking into account the over-pressure at the flue connection of the boiler - see appropriate technical data table on pages 8,9 or 10.

The minimum inclination of any part of the flue system should not be less than 3°.

If it is likely that excessive draught/depression will occur, then a draught stabiliser should be incorporated into the flue system (see Fig.4 and Fig.5)

Legend	Item
1	ADI-NOx Boiler
2	Horizontal section - should be as short as possible with minimum number of elbows
3	Condense Tee
4	Drain point
5	Flue draught stabiliser
6	Vertical section

Legend	Item
7	Terminal section
8	Individual boiler flue pipe vertical section
9	Header Tees
10	Flue header section inclined towards main vertical flue pipe at min 3°

Typical single boiler flue system

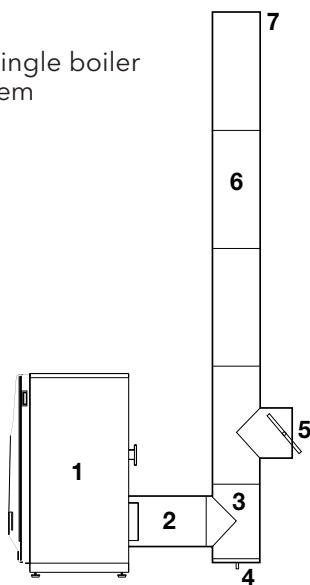


Fig. 4

Typical multiple boiler flue system

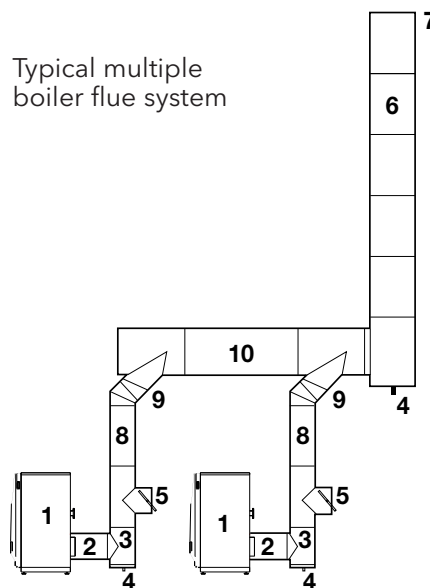


Fig. 5



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