



Stelrad Ideal

G.R.D.

# IDEAL

## CONCORD CX 140/340

### GAS BOILERS



### COMMERCIAL DATA



This data sheet is intended to provide information necessary to assess the suitability of the Ideal Concord CX for a particular application. An installation instruction book giving detailed information is available from Stelrad on request.

Ideal Concord gas boilers produced by Stelrad have proved their efficiency and popularity in thousands of commercial applications. An £11 million investment in the world's most advanced boiler foundry employing the latest technology has now enabled Stelrad to develop and produce a new improved design gas-fired boiler for commercial systems - Ideal Concord CX.

Features and benefits of this latest addition to the range include:

- GREATER OUTPUT
- REDUCED WEIGHT
- LONG LIFE DURABILITY
- IMPROVED APPEARANCE
- EASY ACCESS FOR CLEANING
- ELECTRONIC CONTROLS
- INCREASED OPTIONS
- FOUR WATER TAPPINGS
- NEW SAFETY AND EFFICIENCY STANDARDS

### Performance

The Concord CX range of boilers has been tested and approved by British Gas to BS 5978, the new British Standard relating to safety and performance of Commercial/Industrial gas boilers.

The approved efficiency of the range is approximately 88% based on the net calorific value of the fuel (81% based on gross calorific

value). Under the standard test conditions previously applied to this type of boiler, even higher levels of efficiency would be attained.

### Construction

The cast-iron sectional design boiler body is insulated by a foil-backed fibreglass blanket.

It is mounted on a sheet steel combustion chamber and has a collector hood, also manufactured from sheet steel, with an integral draught diverter.

The easily assembled casing is of white stove enamelled sheet steel construction incorporating a brown controls panel.

N.B. Loose sections, individual components and sub-assemblies for site assembly of the boiler can be supplied to special order.

### Gas Controls

Control is by a slow opening combination gas control incorporating a thermocouple flame failure device and mains voltage valve. Mains input is via a plug in connector allowing easy isolation for servicing.

### Electrical Controls

**Basic Appliance:** As standard, the boiler is supplied with a controls panel which includes two printed circuit boards incorporating an adjustable electronic boiler thermostat and a fixed-setting pump overrun timer.

**Optional Controls Kits:** Three optional control kits are available giving the following additional plug-in facilities. Option Kit 'A': Provides boiler L.E.D. warning lights to indicate 'Boiler on'; 'Overheat Thermostat Operation' and 'Pilot Failure.' Facility is also provided for

wiring remote indication of these conditions.

Option kit 'B': Provides digital readout of the water flow temperature in °C.

Option kit 'C': Provides the combined facilities of option kits 'A' and 'B.'

### Duty

Ideal Concord CX boilers are suitable for use in the following systems to provide central heating and indirect hot water.

**Open Vented Systems** Combined pumped domestic hot water and pumped central heating; pumped central heating only; pumped domestic hot water only systems can be used on all boiler sizes.

Combined gravity domestic hot water with pumped central heating or gravity domestic hot water only systems, can only be used with boilers up to and including the 205 boiler size.

**Pressurised or sealed systems.** Fully pumped system as above.

### Note:

The boilers are not suitable for direct hot water supply or gravity heating systems.

The maximum static head for open vented systems is 45.7 metres (150 feet). The maximum working pressure for pressurised systems is 4.5 bar (65 p.s.i.).

The electronic control thermostat, as supplied, gives a maximum flow temperature setting of 85°C (185°F). And the simple overheat thermostat is set to 100°C (212°F). A simple adjustment during installation or commissioning allows the maximum control thermostat setting to be increased to 100°C (212°F) and the overheat thermostat can be adjusted to a setting of 110°C (230°F). This procedure is described in the Ideal Concord CX Multiple Boiler Installations data book.



BASIC APPLIANCE



OPTIONAL KIT B



OPTIONAL KIT A



OPTIONAL KIT C





## GRAVITY CIRCULATION

Indirect gravity domestic hot water systems can only be provided for with the Ideal Concord CX 140, 170 and 205 boilers.

The close taper nipple and tee into which the thermostat phial pocket is mounted, (all supplied loose with the boiler) must be positioned at the gravity domestic hot water flow outlet chosen. The indirect domestic hot water cylinder must be sized between 270 litres (60 gallons) and 450 litres (100 gallons) and the primary circuits must be at least 35mm (1 1/4").

The design of the gravity flow and return must be in accordance with figure 1.

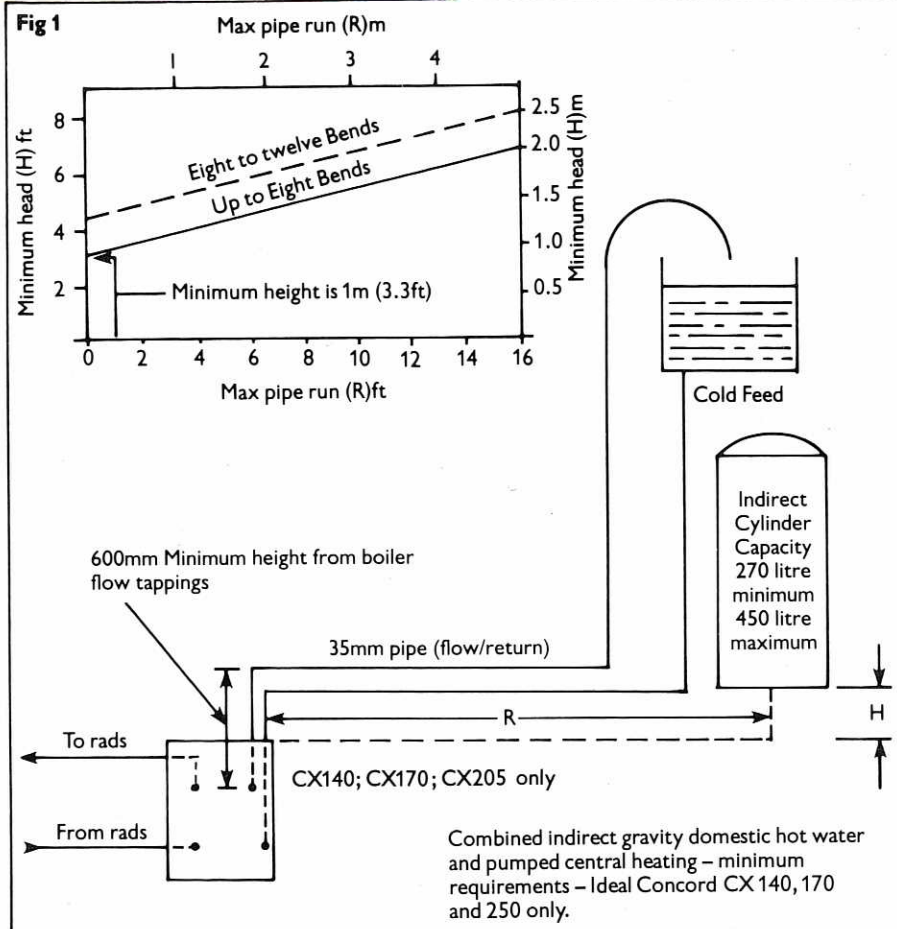
Gravity flow and return connections must be made to the same side on the rear of the boiler only. When combined with a pumped heating system, the heating flow and return connections should be made to the opposite side of the back face only.

A distributor tube is pre-fitted to the rear R.H. side bottom (return) tapping, for the heating return.

If this tapping is selected for the gravity return, then the distributor tube and flange should be repositioned to the L.H. side bottom (heating return if in a combined system) tapping on the rear face.

In order to ensure adequate heat dissipation gravity domestic hot water circuits MUST NOT be fitted with any mechanical or electro-mechanical device, intended to control secondary domestic hot water storage temperature, which either reduces or completely stops circulation through the primary domestic hot water circuit.

Clamp-on or immersion cylinder thermostats should be used provided they are intended to stop boiler short cycling only.



## MINIMUM STATIC HEAD

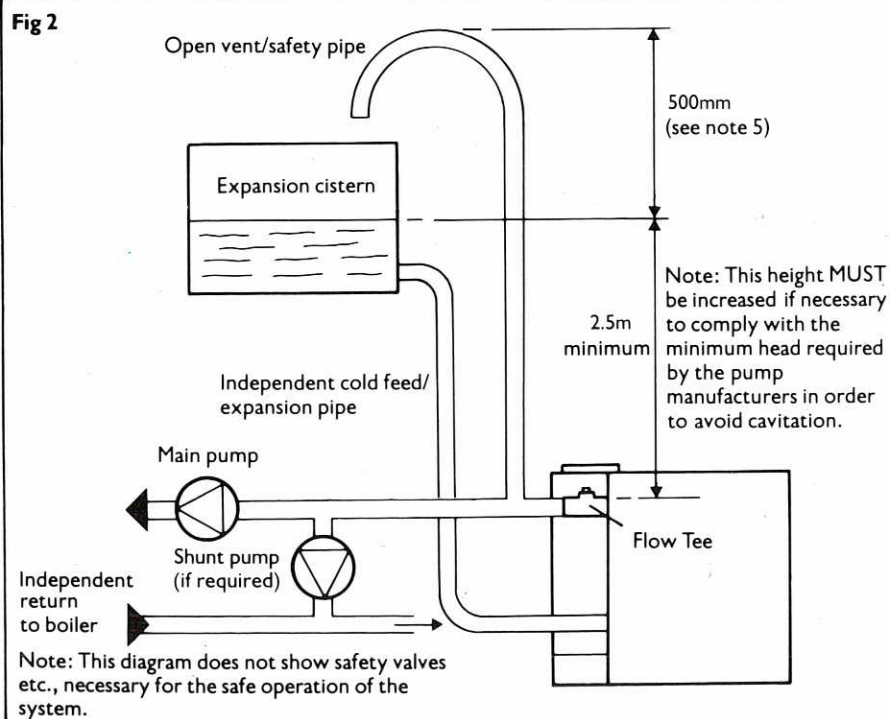
The minimum head requirement for the Ideal Concord CX boiler range is 2.5 metres (8' approx) depending on the particular characteristics of the system design as indicated in Fig. 2.

The information provided is based on the following assumptions.

1. An independent open vent/safety pipe connection is made to redundant boiler flow tapping or is positioned immediately after the system flow-pipe connection to the header, as shown.
2. An independent cold feed/expansion pipe connection is made to the redundant boiler return tapping. Cold feed/expansion pipe connections made to the system return will result in an increase in static head requirements, brought about by the additional resistance of the distributor tube.

Surging may also increase.

3. The maximum flow rate through the boiler is based on a temperature difference of 11°C (20°F) at full boiler output and the circulating pump is positioned in the flow to the system.
4. That the boiler is at the highest point of circulation in the system. Systems designed to rise above the flow tappings will, of course, automatically require a minimum static head higher than shown.
5. The position of the open vent/safety pipe above the expansion cistern water level is given as a guide only. The final position will depend upon the particular characteristics of the system. Pumping over of water into the expansion cistern should be avoided.



## FULLY PUMPED SYSTEMS

Only one flow and one return connection is required on the rear face of the appliance. These connections can be either on the same side or on opposite sides.

The close taper nipple and tee into which the thermostat phial pocket (all supplied loose) is mounted, should be positioned on the flow outlet selected.

A distributor tube is pre-fitted to the rear R.H. side bottom (return) tapping but if the L.H. side is used for the return, then the distributor tube must be re-fitted to the rear L.H. side bottom tapping.

## WATER TREATMENT

There is a basic need to treat the water contained in all heating and indirect hot water systems, particularly open vented systems. It is incorrectly assumed that because boilers are operating in conjunction with what is an apparently closed circuit an open vented system will not under normal circumstances allow damage or loss of efficiency due to hardness salts and corrosion once the initial charge of water has been heated up a few times.

One millimetre of lime reduces the heat conversion from flame via metal to water by 10%.

In practice the deposition of these salts is liable to cause noises from the boiler body or even premature boiler failure. Corrosion and the formation of black iron oxide sludge will ultimately result in premature radiator failure.

Open vented systems are not completely

sealed off from the atmosphere as it is essential to provide a tank open to atmosphere if proper venting and expansion of system water is to be achieved. The same tank is used to fill the system with water and it is through the cold feed pipe that system water expands into the tank when the boiler passes heat into the system.

Conversely when the system cools, water previously expanded is drawn back from the tank into the system together with a quantity of dissolved oxygen.

Even if leakage from the heating and hot water system is eliminated there will be evaporation losses from the surface of the tank which, depending on ambient temperature, may be high enough to evaporate a large portion of the system water capacity over a full heating season.

There will always be corrosion within a heating/hot water system to a greater or lesser degree irrespective of water characteristics unless the initial fill water from the mains is treated. Even the water in closed systems will promote corrosion unless treated.

For the reasons stated above Stelrad Group recommend strongly that when necessary the system be thoroughly cleaned, prior to the use of a stable inhibitor, which does not require continual topping up to combat the effects of hardness salts and corrosion on the heat exchangers of Ideal Concord CX together with their associated systems.

Stelrad Group advise contact directly with major specialists on water treatment such as Fernox Manufacturing Company Ltd., Britania Works, Clavering, Essex, CB11 4QZ.

## SITE REQUIREMENTS

The installation should comply with relevant British Standard Specifications. Codes of Practice and current Building Regulations, together with any special regional requirements of the Local Authorities, Gas Supplier and Insurance Company. All electrical wiring must comply with I.E.E. Regulations for the electrical requirement of buildings.

## POSITION OF BOILER

Minimum clearances required from walls or other fixed objects to allow for installation, maintenance, the free access of combustion air and correct functioning of the draught diverters are shown in the boiler clearance diagram.

## INSTALLATION

For safety use a competent installer to fit this appliance, e.g. CORGI (the Confederation for the Registration of Gas Installers) requires its members to work to satisfactory standards. They are identified by this symbol.



The installation of the boiler must be in accordance with the relevant requirements of the Gas Safety Regulations, I.E.E. Regulations, Local Water Authority Byelaws. It should also be in accordance with any relevant

requirements of the local gas supplier, local authority and the relevant British Standard Codes of Practice.

CP 331.3 Low pressure installation pipes. CP 332.3 Installation of Gas Fired Boilers. CP 341 300-307 Central heating by low pressure hot water.

CP 342.2 Centralised hot water supply. British Gas publications IM/11 Flues for commercial and industrial gas fired boilers and air heaters. Manufacturers notes must not be taken, in any way, as over-riding statutory obligations.

## VENTILATION

Safe, efficient and trouble-free operation of conventionally flued gas boilers is vitally dependent on the provision of an adequate supply of fresh air to the room in which the appliance is installed. Ventilation by grilles communicating directly with the outside air, is required at both high and low levels. The minimum free areas of these grilles must be according to the following scale:-

Total output rating of boiler(s)	position of air vent(s)	Air vent areas (Air direct from outside)
Up to 586kW	High Level	550mm <sup>2</sup> - per kW (1/2 in <sup>2</sup> per 2,000 Btu/h)
	Low Level	1100mm <sup>2</sup> - per kW (1 in <sup>2</sup> per 2,000 Btu/h)

Position ventilation grilles to avoid the risk of accidental obstruction by blockage or flooding. If further guidance on ventilation is required, consult CP 332 Part 3 and the British Gas Guidance notes.

## IMPORTANT

The use of an extractor fan in the same room as the boiler (or in an adjacent room in communication) can, in certain conditions, adversely affect the safe operation of the boiler. Where such a fan is already fitted (or if it is intended to fit an extractor fan after installation of the appliance) the advice of the Gas Region

should be obtained. Tests for spillage of products from the draught diverter when the extractor fan is running and all doors and windows are shut should be carried out after installation. If spillage be detected, the area of permanent ventilation must be increased.

## CHIMNEY SYSTEMS

To ensure safe and satisfactory operation, the boiler must be connected to a chimney system capable at all times of adequately evacuating the combustion products, the approximate volumes of which are given in the performance data table in this publication.

The flue design recommendations contained in CP 332 Part 3, should be strictly observed.

As the Ideal Concord CX boiler is supplied complete with an integral draught diverter NO additional diverter, stabiliser or draught break should be installed in the chimney system without reference to Stelrad Group Limited who will advise on the application.



## PERFORMANCE DATA

\*Note: The gas rates quoted for NATURAL GAS only and assume a C.V. of 1040 Btu/ft<sup>3</sup>.

The gas rate at calorific values differing from that figure may be calculated by dividing the

calorific value of the gas into the figure given in the 'INPUT' column of the table below.

Boiler Size		CX 140	CX 170	CX 205	CX 240	CX 275	CX 310	CX 340
No. of Sections		3	4	4	5	5	6	6
Boiler Input	kW	51.7	62.3	75.1	87.93	100.42	113.6	124.5
	Btu/h	175,400	212,600	256,300	300,000	343,600	387,600	425,000
Boiler Output to water	kW	41.03	49.82	60.08	70.34	80.6	90.86	99.6
	Btu/h	140,000	170,000	205,000	240,000	275,000	310,000	340,000
*Gas rate	m <sup>3</sup> /h	4.81	5.83	7.02	8.21	9.43	10.57	11.58
	ft <sup>3</sup> /h	170	206	248	290	333	376	411
Approx flue gas Volume in secondary	4.5% CO <sub>2</sub> 100°C dm <sup>3</sup> /s	44	54	65	75	86	97	107
flue of chimney system	4.5% CO <sub>2</sub> 212°F ft <sup>3</sup> /m	94	114	137	160	182	207	227
Manifold setting pressure	mbar	12.5	8.8	13.5	11.7	11.5	13.2	12.8
	in.w.g.	5.0	3.5	5.4	4.7	4.6	5.3	5.1

## GENERAL DATA

Boiler Size		CX 140	CX 170	CX 205	CX 240	CX 275	CX 310	CX 340
No. of Sections		3	4	4	5	5	6	6
Flow Tappings	Rc				2 x 2 at rear			
	in. BSP				2 x 2 at rear			
Return Tappings	Rc				2 x 2 at rear			
	in. BSP				2 x 2 at rear			
Maximum static water head	metres				45.7			
	feet				150			
Maximum pressure	bar				4.5			
	psi				65			
Gas Inlet connection	Rc	← 3/4 →	← 3/4 →	← 3/4 →	← 3/4 →	← 1 →	← 1 →	← 1 →
	in. BSP	← 3/4 →	← 3/4 →	← 3/4 →	← 3/4 →	← 1 →	← 1 →	← 1 →
Pressure required at the Boiler inlet for the rated input	mbar (gauge)	← 37.0 →	← 37.0 →	← 37.0 →	← 37.0 →	← 37.0 →	← 37.0 →	← 37.0 →
	in.w.g.	← 14.9 →	← 14.9 →	← 14.9 →	← 14.9 →	← 14.9 →	← 14.9 →	← 14.9 →
Electricity supply		200/250 Volts single phase 50Hz fuse 3A						
Nominal flue size (to BS.835)	mm	150	175	175	200	200	238	238
	in	6	7	7	8	8	9.4	9.4
Diverter outlet socket Internal diameter	mm	184	184	213	213	238	238	238
	in	7.3	7.3	8.4	8.4	9.4	9.4	9.4
Length of burner bars (overall)	mm	377	497	497	617	617	737	737
	in	14.8	19.5	19.5	24.3	24.3	29.0	29.0
Main burner injectors	No. OFF				3			
	Size (mm)	2.15	2.30	2.54	2.69	2.96	3.09	3.27
Overheat thermostat		LANDIS & GYR RAK 21.4/2832						
Piezo igniter		VERNITRON 60024/001						
Gas Control		Honeywell 3/4in. BSP ICGC V 4400 C1211 Softlite						
Pilot Burner	0.24kW (820 Btu/h)	Honeywell Q314A5823 (with BCR 18 injector)						
Thermocouple		Honeywell Q309A2754 (900mm lg)						
Approximate Dry weight	kg	190	240	240	300	300	360	360
	lb	420	530	530	660	660	790	790
Water content	litre	22	30	30	37	37	45	45
	gal.	4.8	6.6	6.6	8.2	8.2	9.9	9.9

## FIRE FACE CORROSION

High rates of fire face corrosion due to acidic condensate formation is not usually a problem in practice, when using natural gas fired, steel or cast-iron sectional boiler.

Condensate can form within boiler flueways on cold start but this is usually evaporated quite quickly and is not retained unless the boiler is operated for long periods at very low flow/return temperatures or short cycled under low load.

However, the condensed combustion

products from natural gas fired boilers have an acidic Ph value. Permanent condensate formation within the boiler flueways will reduce boiler life and can, depending on system design and method of operation, be an embarrassment if allowed to form and run out of flue cover plates or sealing doors on the boiler or flue system.

It is recommended that gas fired Ideal Concord CX boilers are operated to avoid this by maintaining a high flow temperature from

the boiler and utilising a shunt pump to provide the minimum volume flow requirements (see flow rate table). This is particularly relevant to mixing systems under low load.

Should system operation cause large quantities of condensate to form within the boiler flueways on cold start then this can be avoided by fitting back end protection equipment similar to that used for oil firing. The Applications Department of Stelrad Group Ltd will give further advice in this area if contacted.



## MINIMUM FLOW OF WATER

The system must be designed to allow for adequate internal circulation within the boiler and sufficient heat release from the boiler body whenever the burner is firing or during pump overrun.

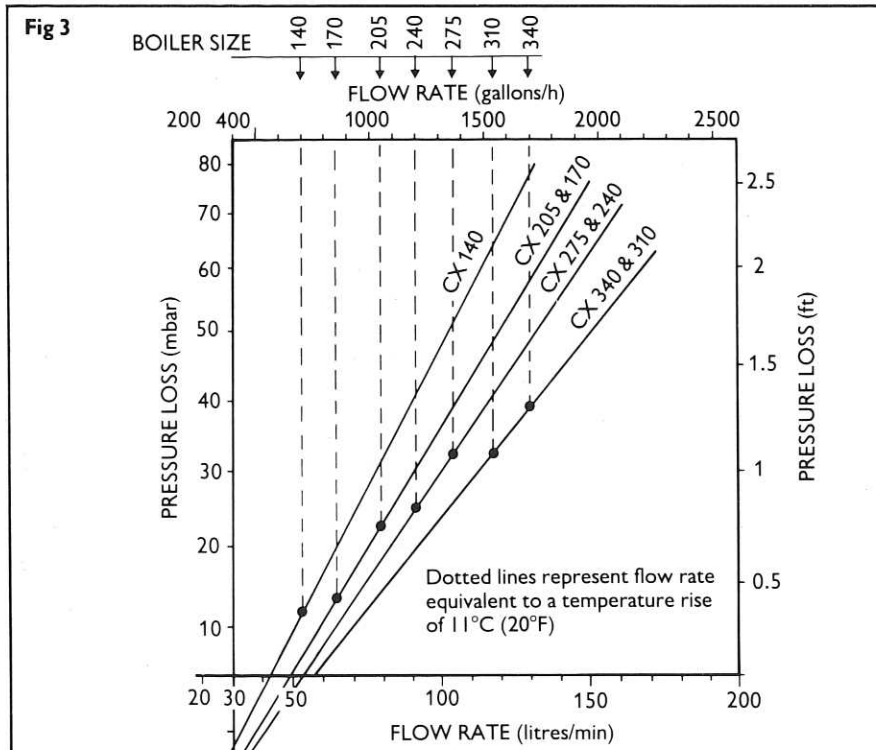
To this end, compliance with the minimum volume flow rates stipulated in the table must be achieved.

Additionally, with fully pumped or independent systems, the system must be controlled so that part of the load is available during the pump overrun period to dissipate heat.

Boiler	Normal Water Flow Rate Temperature Difference 11°C (20°F)		Minimum Water Flow Rate Temperature Difference 35°C (63°F)	
	litres/sec	Gals/min	litres/sec	Gals/min
CX 140	0.89	11.75	0.28	3.7
CX 170	1.08	14.25	0.34	4.5
CX 205	1.30	17.16	0.41	5.4
CX 240	1.53	20.19	0.48	6.3
CX 275	1.75	23.10	0.55	7.3
CX 310	1.97	26.00	0.62	8.2
CX 340	2.16	28.50	0.68	9.0

## PUMP SELECTION

The choice of pump should take account of hydraulic resistance given in Fig 3.



## FLOW TEE

It is essential that the close taper nipple and flow tee, which houses the phial pocket for the electronic control and high limit sensor, be positioned strictly in accordance with the information provided in the Installation and Servicing Instructions supplied with the boiler. i.e. Combined systems (gravity domestic hot water AND pumped heating) – position on gravity flow.

Fully pumped systems – position on pumped flow.

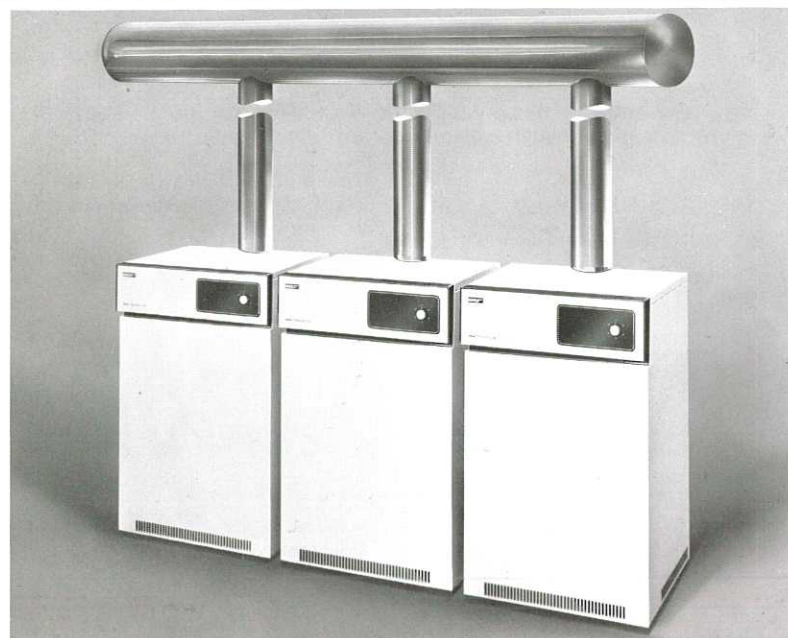
## PACKAGING

Factory assembled boilers are dispatched from the works in three packages mounted and shrink-wrapped on a wooden base.

1. Assembled boiler body on a wooden pallet.
2. Carton containing the casing, fastenings, flue brush and instruction book.
3. Carton containing the upper front panel/control box.

NOTE: Loose sections and platework for site assembly can be supplied to special order.

## MULTIPLE BOILER INSTALLATIONS

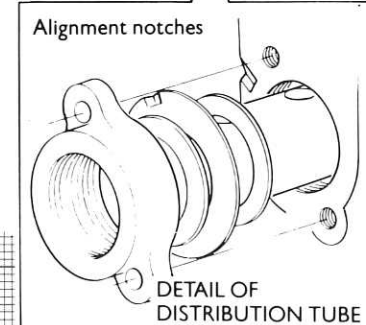
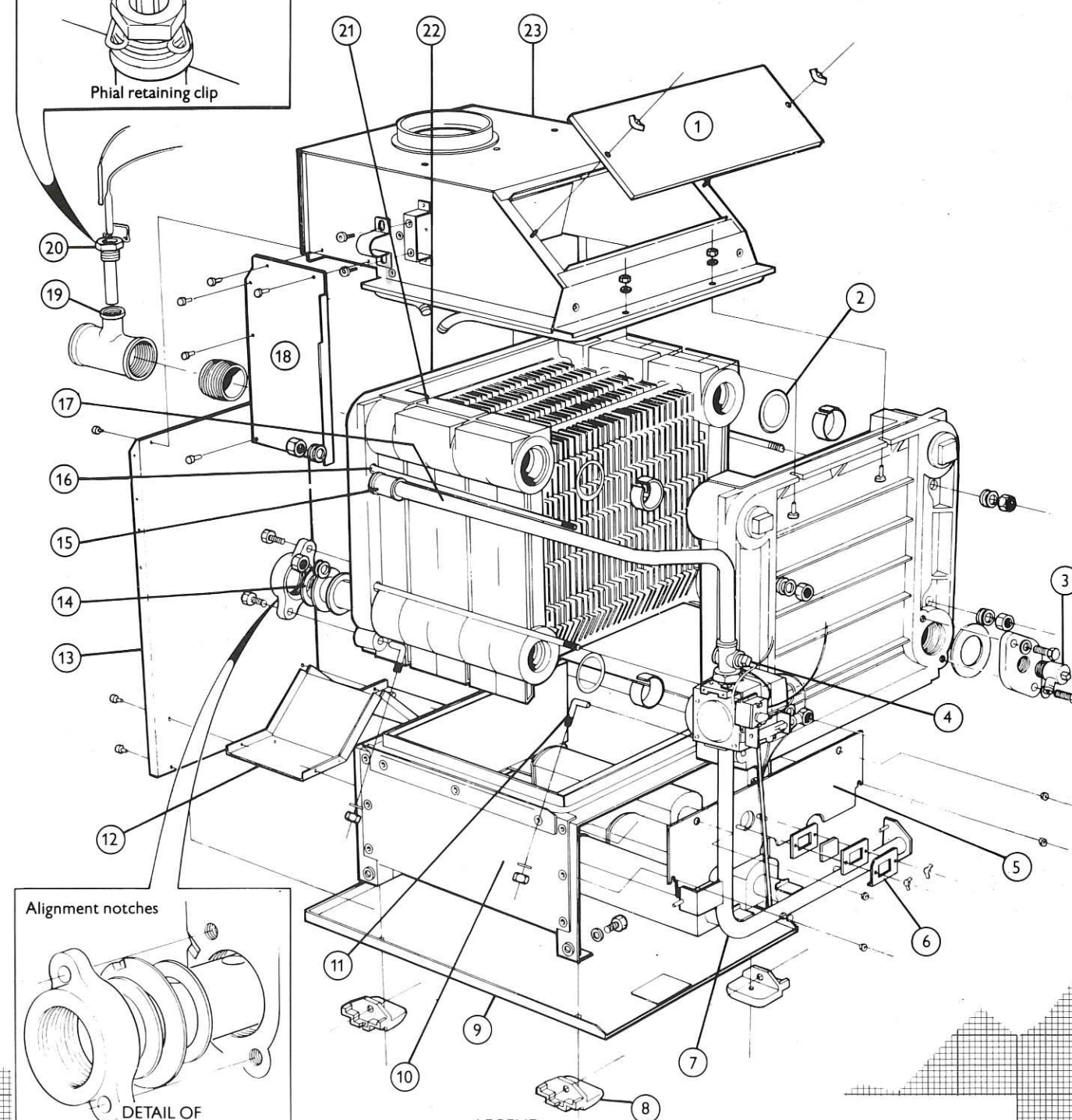
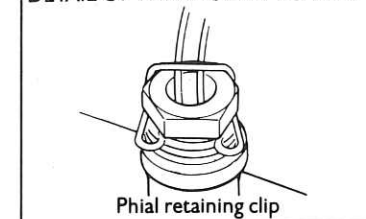


The Ideal Concord CX 140-340 range has been designed to be highly suited to multiple boiler installations. Stelrad recommend the use of boilers of the same size in groups of two to six units. The illustration shows a multiple installation of three boilers.

A comprehensive guide to multiple installations of Ideal Concord CX boilers is available on request from Stelrad.

## BOILER ASSEMBLY

### DETAIL OF THERMOSTAT POCKET



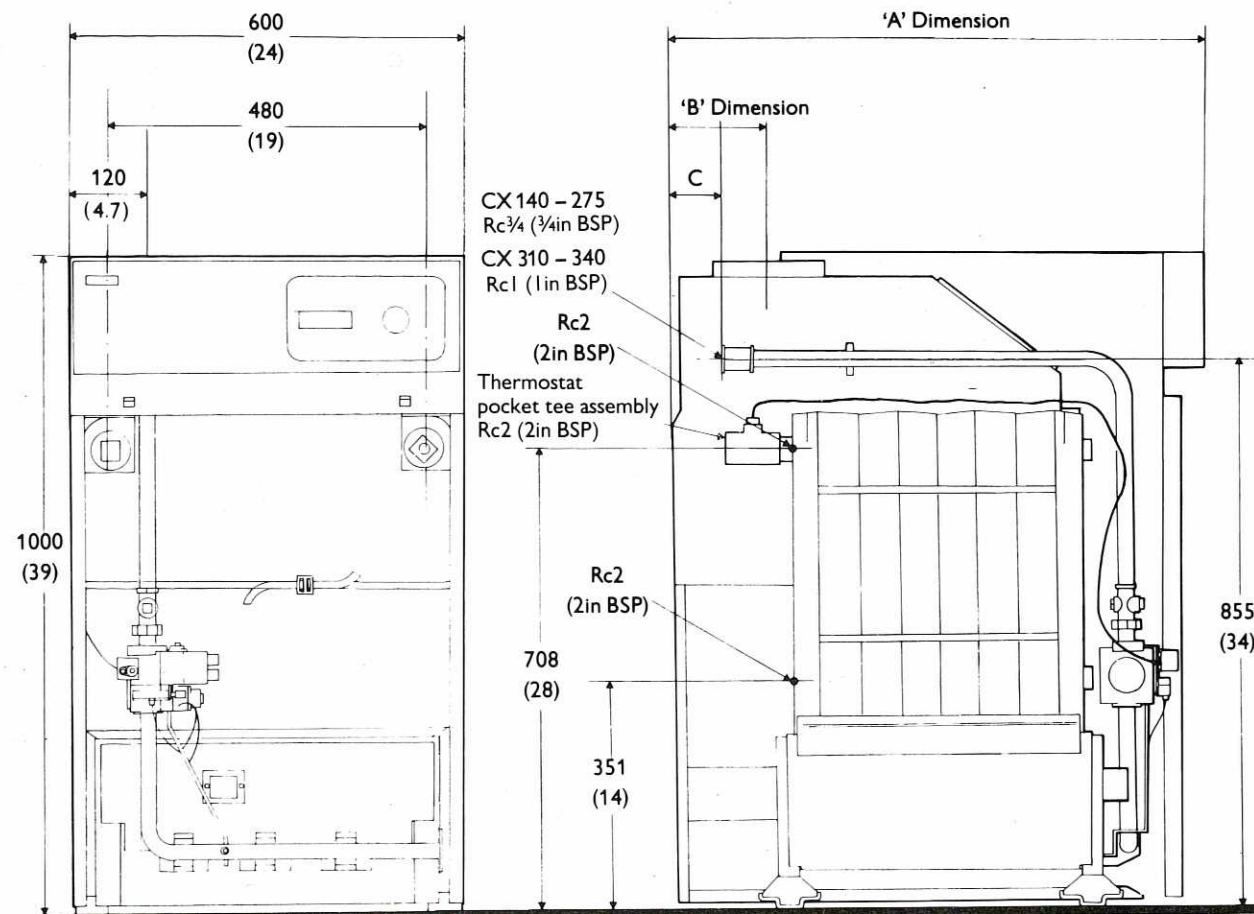
### LEGEND:

- |  |  |
|--|--|
| 1. Cleanout cover                        | 13. Draught diverter/back panel                                |
| 2. Section alignment rings and 'O' rings | 14. Distributor tube (shown on the left hand side for clarity) |
| 3. Drain cock                            | 15. Gas inlet  |
| 4. Gas cock                              | 16. Tie rod  |
| 5. Front plate                           | 17. Gas inlet pipe   |
| 6. Sightglass assembly                   | 18. Spillage skirt   |
| 7. Burner controls assembly              | 19. Flow tee   |
| 8. Boiler foot                           | 20. Thermostat pocket  |
| 9. Base tray (heat shield)               | 21. Middle section   |
| 10. Combustion chamber                   | 22. End section  |
| 11. Section hook bolt                    | 23. Collector hood   |
| 12. Down draught deflector               |  |



## BOILER DIMENSIONS

Boiler Size	'A' Dimension	'B' Dimension	'C' Dimension
CX 140	700 (27.5)	126 (5)	76 (3)
CX 170	833 (32.8)	146 (5.7)	89 (3.5)
CX 205			
CX 240	995 (39.2)	159 (6.3)	90 (3.5)
CX 275			
CX 310	1163 (45.8)	184 (7.2)	90 (3.5)
CX 340			



Dimensions in mm (in)  
Imperial dimensions approximate

## BOILER HOUSE CLEARANCES

Boiler Size	CX 140	CX 170	CX 205	CX 240	CX 275	CX 310	CX 340
No. of Sections	3	4	4	5	5	6	6
At Front mm (in)	750 (29.5)						
At Rear mm (in)	NONE						
At Sides mm (in)	50 (2)	50 (2)	50 (2)	150 (6)	150 (6)	200 (8)	200 (8)

Stelrad Group Limited pursue a policy of continuing improvement in design and performance of its products. The right is, therefore, reserved to vary specification without notice.

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# IDEAL CONCORD CX BY

