

28 – 30 Oldham Street

Air Quality Management Strategy

Rev 03

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Introduction

This Air Quality Management Strategy has been produced as a supporting document in the planning submission for the proposed development of the 28 – 30 Oldham Street, Manchester.

28 – 30 Oldham Street is an existing basement and ground floor bar, (with three vacant levels above) in the Northern Quarter, Manchester. Current proposals are to redevelop the existing building, with change of use to a new 81 bedroom city centre Hotel.

Latest proposals are for the change of use of the vacant upper three floors and the creation of a fourth floor within the existing roof void to provide hotel accommodation, in addition to minor external alterations at ground level.

The plans include for 10 hotel rooms at basement level, 10 hotel rooms at ground level, 17 hotel rooms in each of the levels from 1-3 and an additional 10 rooms in the roof void at roof level.

There is also the provision for a 29 sq.m flexible use (A3/A4) commercial unit and a hotel reception space (28 sq. m) at ground floor level.

Whilst the building is not listed it falls within the Stevenson Square Conservation area, which is an area steeped in history.

Greater Manchester, like many urbanised regions of the UK, contains areas that suffer from poor air quality. However, significant effort has been made over the last decade to improve air quality across the greater city.

Air pollution in Greater Manchester is largely due to the vast number of vehicles that travel through the city and the dense network of roads and buildings which not only emit, but also prevent pollution from dispersing.

The Environment Act 1995 introduced a system of Local Air Quality Management (LAQM). This places legal duties on local authorities to review and assess air quality in their areas against objectives for seven air pollutants set out in the National Air Quality Strategy.

Air quality objectives are concentrations of air quality pollutants that are considered to be acceptable, given the known effects they may have on health and the environment.

As required by the law, where the local authority considers that objectives are unlikely to be met, an air quality management area must be declared to reflect the extent of exceedances. A further assessment is required to identify which sources of air pollution contribute to the exceedances.

An Air Quality Management Plan must then be developed which sets out proposed measures to improve air quality in pursuit of achieving the objectives.

Manchester currently meets six of the air quality objectives relevant to LAQM (for lead, sulphur dioxide, benzene, 1,3 butadiene, carbon monoxide and PM10 particulates).

In common with many other urban areas in the UK, the principal pollutant of concern in Manchester is nitrogen dioxide (NO2). Exceedances of the annual objective are predicted in the city and are a particular issue for the city centre and close to busy roads.

PM10 is also a key pollutant nationally and levels are elevated close to busy roads and in the city centre.

Greater Manchester Air Quality Action Plan has involved a review of the strategies, policies and plans which tackle or are in some way related to air quality, to develop a clear, robust and meaningful set of actions which will deliver real changes in terms of air quality, whilst supporting the sustainable economic growth of the region.

This Air Quality Management Strategy for 28 – 30 Oldham Street intends to present the proposals in line with the Manchester City Council Planning Policies showing that it will have minimum impact on the local air quality. Where necessary, suitable mitigation measures will be proposed to minimise impacts and allow the development to proceed.



European Level

Action to manage and improve air quality is largely driven by European (EU) legislation. The 2008 ambient air quality directive (2008/50/EC) sets legally binding limits for concentrations in outdoor air of major air pollutants that impact public health such as particulate matter (PM10 and PM2.5) and nitrogen dioxide (NO2). As well as having direct effects, these pollutants can combine in the atmosphere to form ozone, a harmful air pollutant (and potent greenhouse gas) which can be transported great distances by weather systems.

The 2008 directive replaced nearly all the previous EU air quality legislation and was made law in England through the Air Quality Standard Regulations 2010.

National

This Air Quality Strategy (Defra, 2007) sets out air quality objectives and policy options to further improve air quality in the UK from today into the long term.

The AQS identifies nine ambient air pollutants that have the potential to cause harm to human health. These pollutants are associated with local air quality problems, with the exception of ozone, which is instead considered to be a regional problem.

2015 Supreme Court Ruling

In April 2015 the Supreme Court issued a final judgement on the case brought by the NGO ClientEarth, ordering the Government to end breaches of EU limits on nitrogen dioxide (NO2).

The legal challenge was prompted by the failure since 2010 of London and several other regions to meet EU limit values for NO2. The court ruled that the Government must take action to cut air pollution, with a national plan to be published by the end of December 2015. Plans were published but ClientEarth brought a further case to the High Court, which ruled that the Government's Air Quality Plan failed to comply with the Supreme Court ruling or relevant EU directives, and that it must publish new plans by 31 July 2017.

Greater Manchester urban area represents one of the 38 non-compliant zones in the UK 1, due to exceedances of the annual mean NO2 limit value. Greater Manchester is not projected to achieve compliance until 2020 without intervention; therefore considerable and far-reaching action is required to achieve compliance, with bodies such as TfGM providing essential support.

Greater Manchester Air Quality Strategy and Air Quality Action Plan

The Greater Manchester Air Quality Strategy and Action Plan (AGMA, 2006) sets out a wide-reaching package of measures to address air pollution from road transport, with a particular focus on achieving EU limits for NO2 by 2010.

The overall strategy for improving air quality in Greater Manchester defined in the Implementation Plan was focused on:

- Increasing travel by sustainable modes
- Reducing acute pollution incidents from traffic
- Improving vehicle efficiency, including vehicle and fuel technology and efficient driving techniques
- Encouraging smarter travel through improved fares, ticketing and information, management of demand for car travel and promotional campaigns
- Better integration of transport and new development
- Reducing trips by motor vehicles by improvements to public transport and to infrastructure for walking and cycling
- Improving network efficiency.

Progress on the Action Plan was reported in the LTP3 Progress Report 2014. In summary, the Action Plan has not achieved the improvements that were hoped for, since the impact of the individual measures often reduced overall emissions across the conurbation whilst changes on individual roads were imperceptible.

Therefore, future actions are proposed to be focused on the most beneficial options within specific geographic areas, such as the roads within the Air Quality Management Area (AQMA) and, in the context of this plan, the Key Priority Areas.

Local Policies

The Greater Manchester councils and Transport for Greater Manchester have also published a number of policy documents that incorporate a consideration of local and Greater Manchester-wide air quality and climate change.

The following strategic policies are considered the most important;

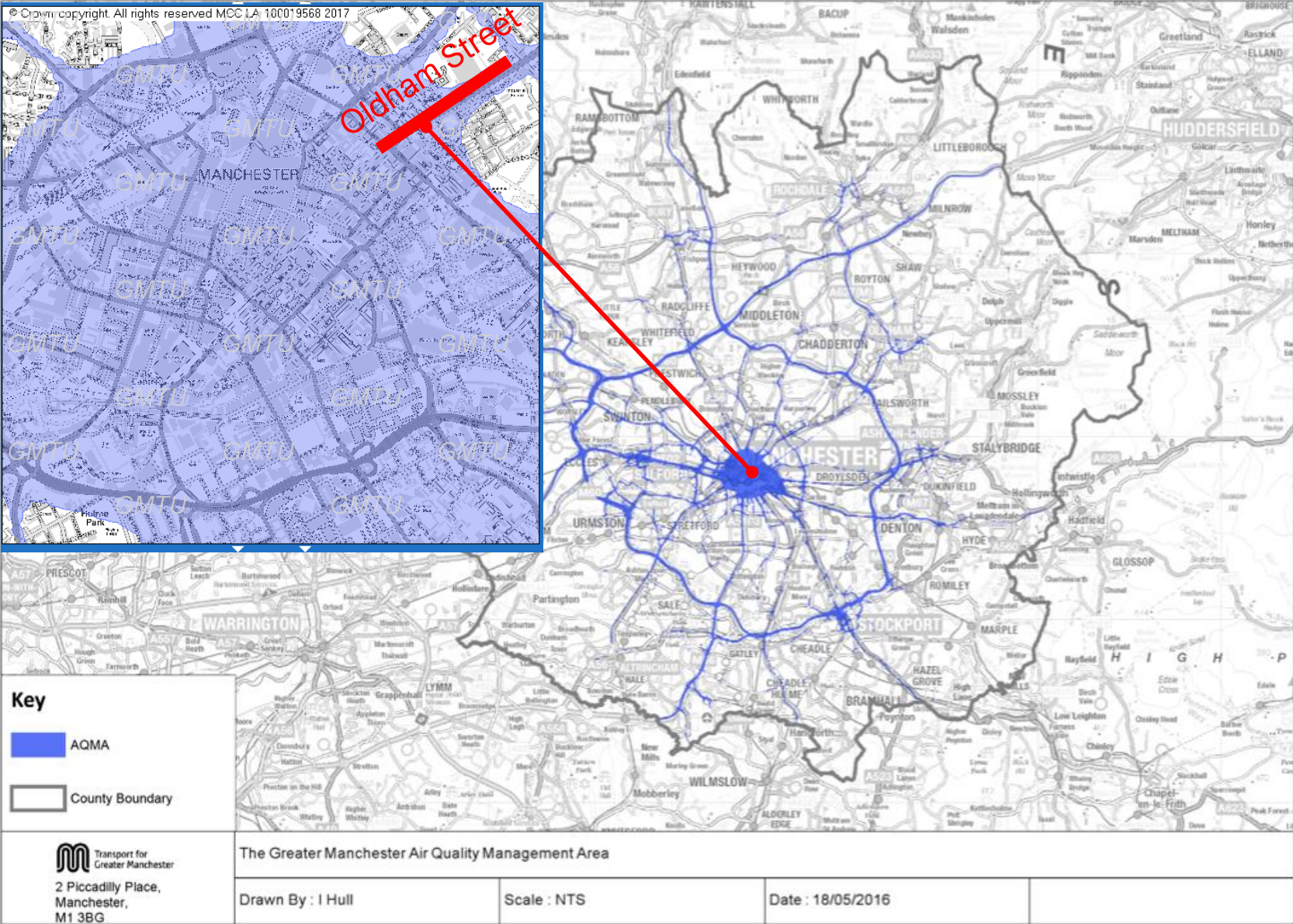
- Greater Manchester Transport Strategy 2040
- Greater Manchester Climate Change Strategy
- Greater Manchester Strategy
- Greater Manchester Spatial Framework (GMSF)
- Growth and Reform Plan 2014
- Greater Manchester Transport Vision 2040
- Low-Emission Strategy for Greater Manchester

Understanding the Problem: AQMA

AQMAs were originally declared for both annual mean NO2 and PM10 in 2001-2002. The AQMAs were amended between 2004 – 2006 and they were also revoked for PM10. 10 AQMAs were subsequently declared between 2005-2006 for the whole of Greater Manchester based on the modelled 35µg/m3 isopleths for annual mean NO2, which, considering the EU Limit is 40µg/ m3, acknowledged the uncertainties of modelling and could be viewed as being cautious. Recent modelling has shown an improvement in NOx emissions and that the AQMA has reduced in size.

The map adjacent shows the Greater Manchester Air Quality Management Area. (AQMA)

The proposed Location of the 28 – 30 Oldham Street falls within the AQMA.



Understanding the Problem: Monitoring Pollutants

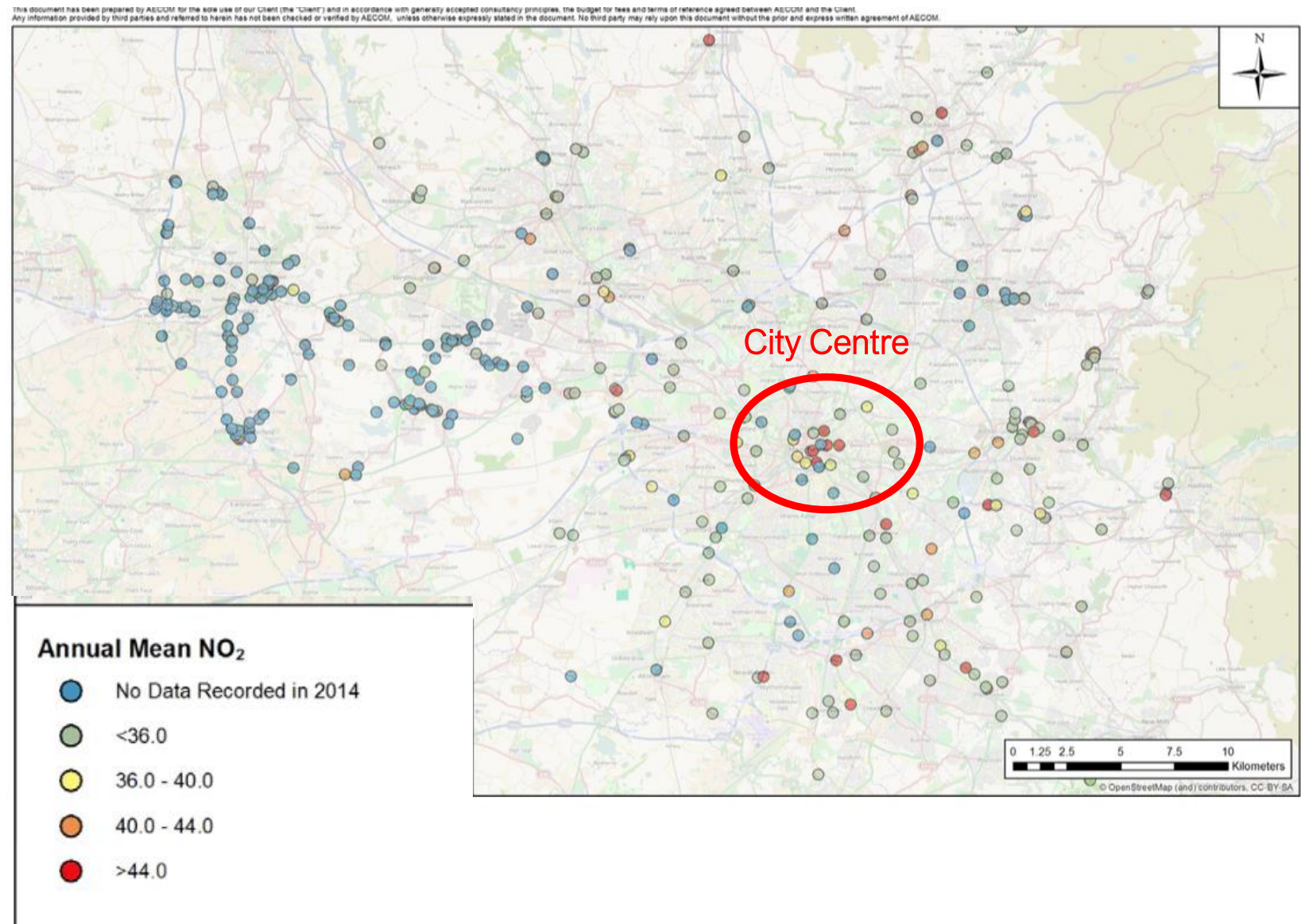
The map adjacent shows the Air Quality Monitoring Locations in Greater Manchester, Annual Mean NO₂ Concentrations Recorded in 2014.

NO₂ is measured using both automatic and non-automatic techniques.

Automatic monitoring sites: Electronic air pollution analysers that provide high quality, independently audited data in near real time. Manchester has automatic monitoring sites located at Piccadilly Gardens (an urban centre site), Manchester South (a suburban site close to Manchester airport) and Oxford Road (a kerbside site close to the city centre).

Non-automatic monitoring sites: These sites provide air quality samples (e.g. passive diffusion tubes) that are collected and analysed at regular intervals to provide pollutant concentrations over a certain time period (e.g. a day, week or month). They are located across Manchester to supplement the automatic monitoring sites and provide information about concentrations of air pollutants across

It can be noted from the map that the city centre shows highest annual Mean NO₂, with multiple red points. The proposed new development 28 – 30 Oldham Street is located in the city centre.



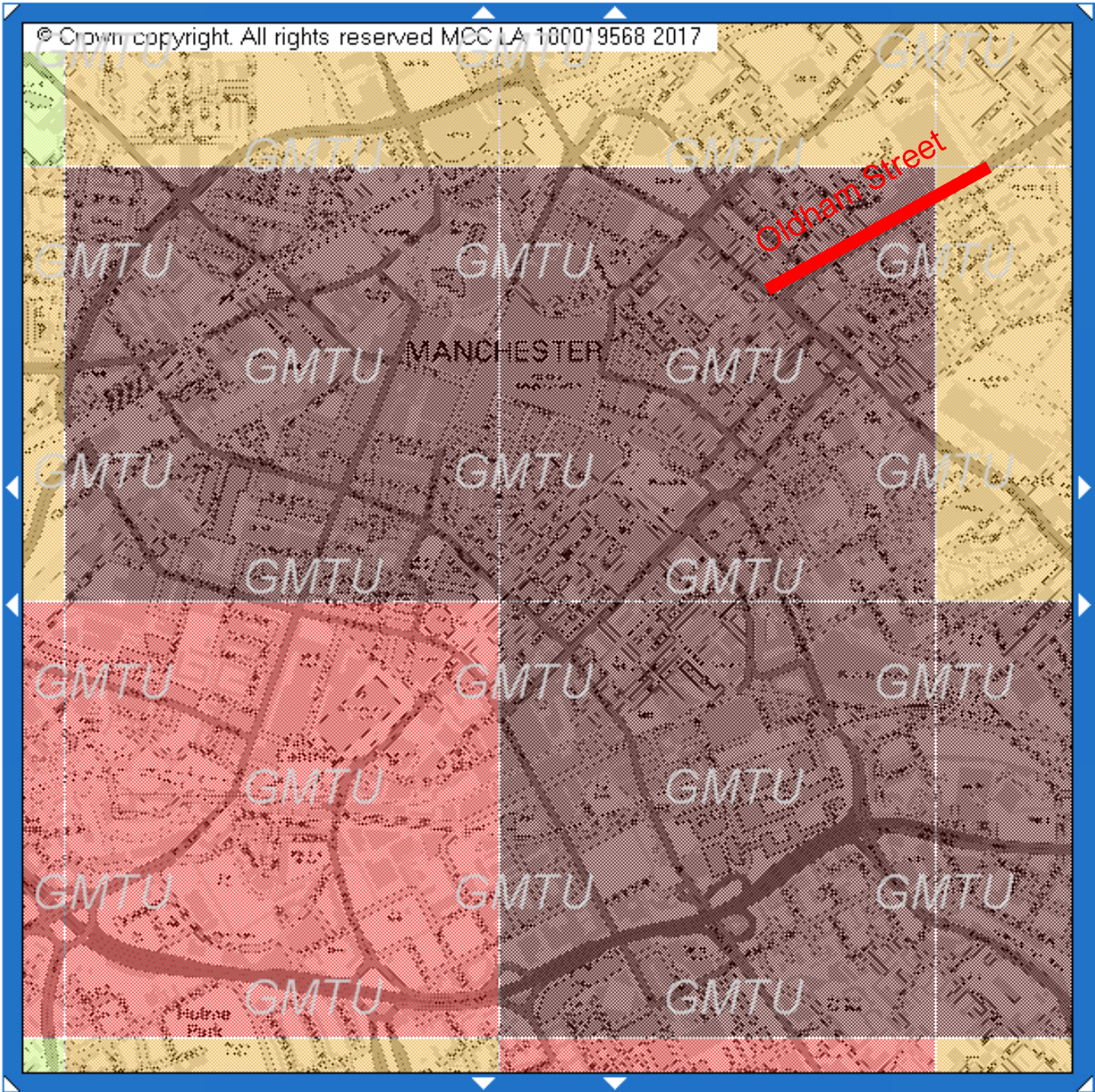
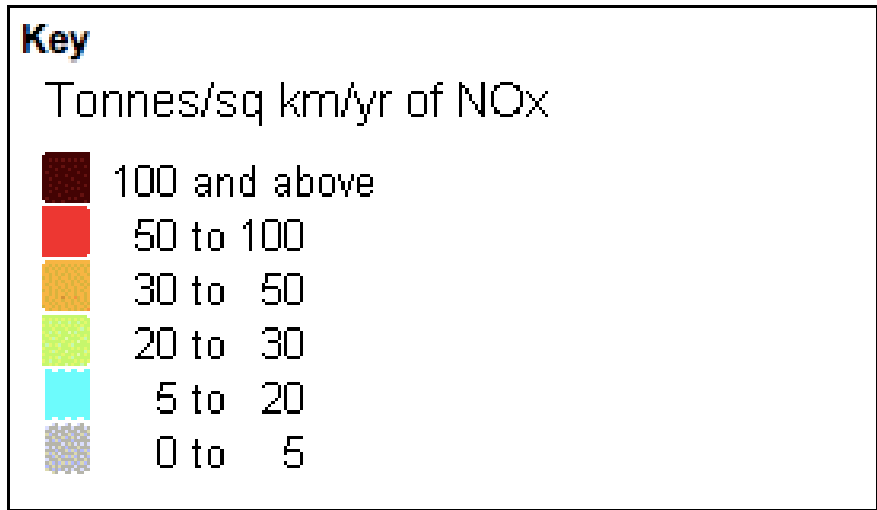
Understanding the Problem: NO₂ data

The map adjacent is the ENIGMA data NO₂ taken from Great Air Manchester live website, recorded on Wednesday 30th August 2017.

It can be noted from the chart that Oldham Street falls in an area with highest NO_x content.

The EU Limit is 40µg/ m³ /year.

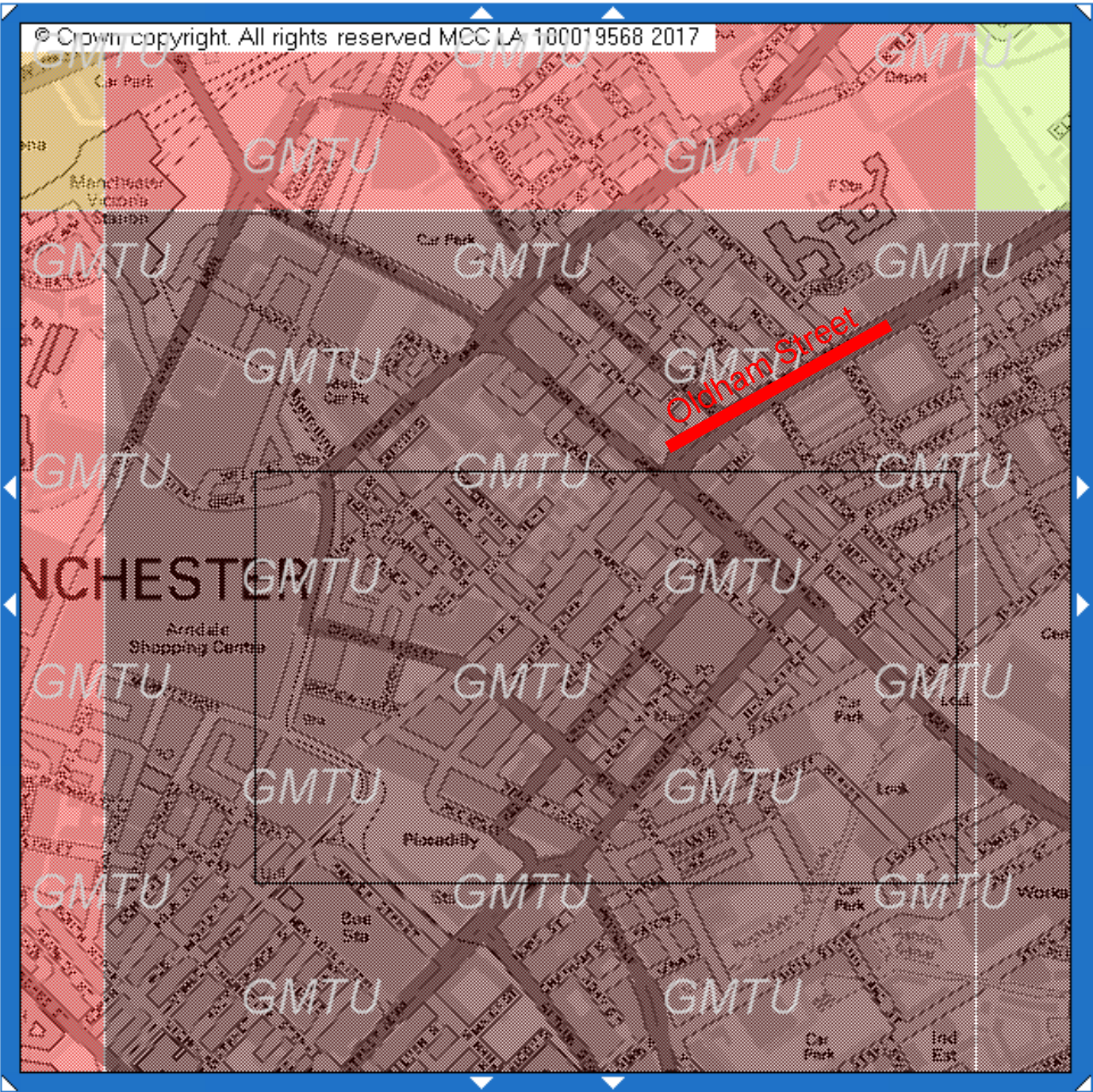
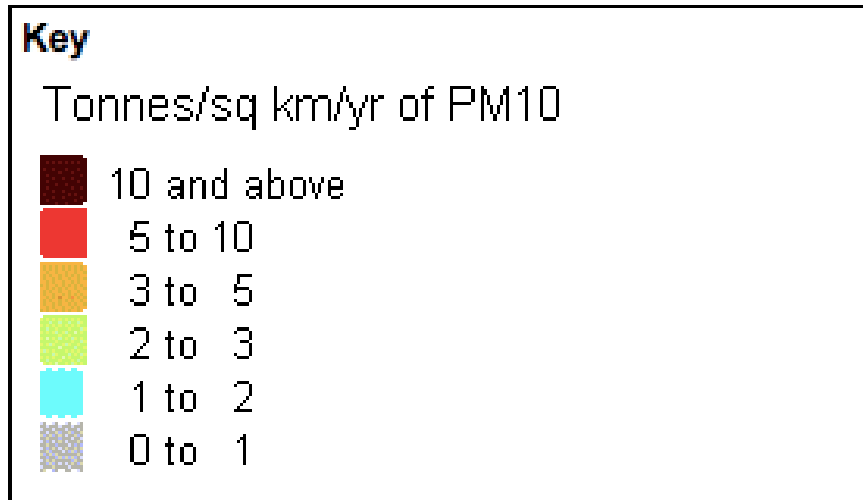
NOTE: the scale below is in tonnes/km²/year.



Understanding the Problem: PM₁₀ data

The map adjacent is the ENIGMA data PM10 taken from Great Air Manchester live website, recorded on Wednesday 30th August 2017.

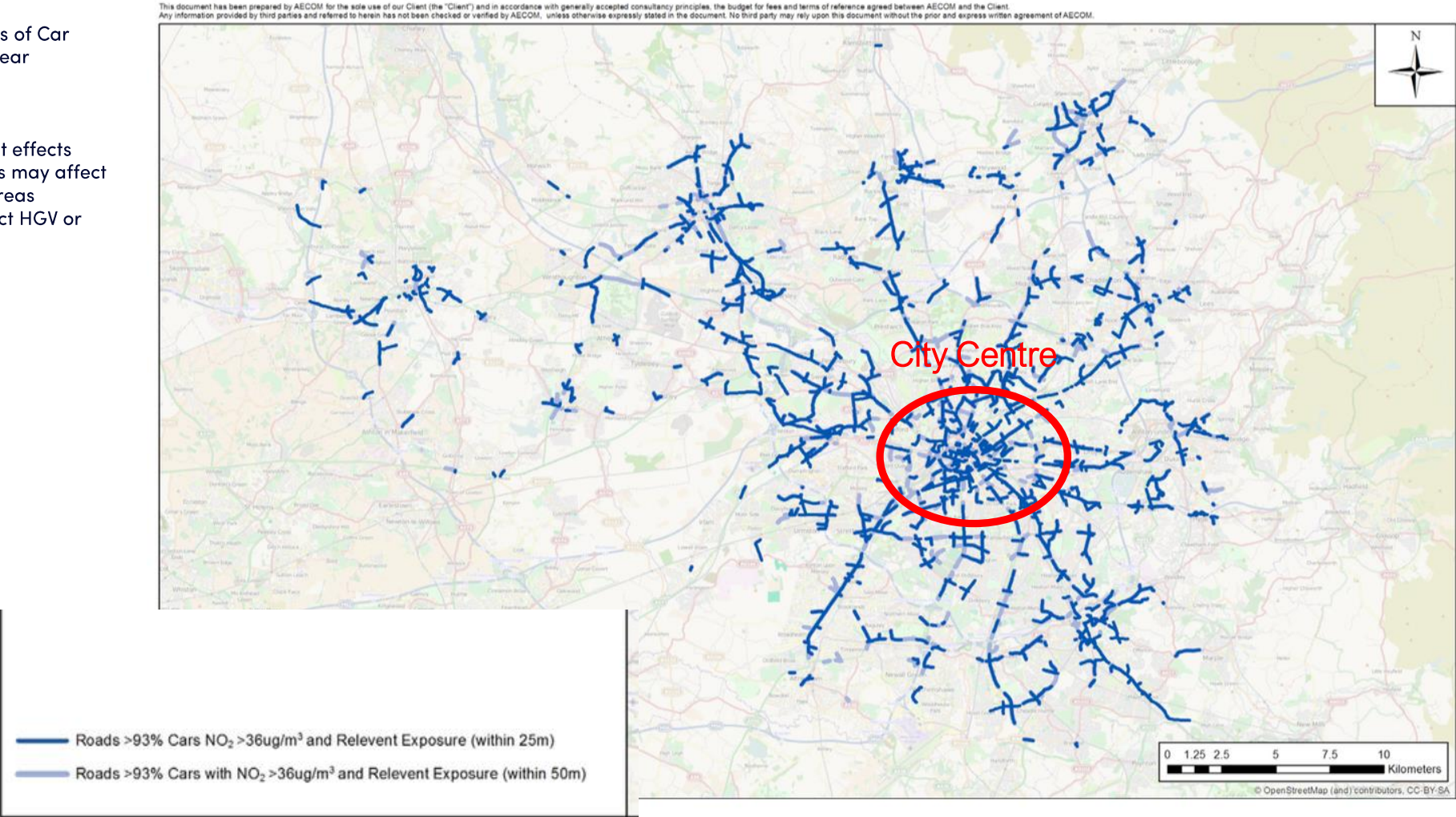
It can be noted from the chart that Oldham Street falls in an area with highest PM10 content.



Understanding the Problem: High Proportions of Car movement

The map adjacent shows the Roads with High Proportions of Car Movements and High Annual Mean NO₂ Concentration near Properties.

This analysis indicates where targeted Actions should be implemented, although the relationship between different effects should also be recognised. For example, bus interventions may affect car use due to the model shift between travel types, whereas public/private transport interventions are unlikely to affect HGV or other freight movements due to the type of journey.



Greater Manchester Air Quality Plan

The Greater Manchester Air Quality Action Plan sets out measures which will reduce air pollution while supporting the sustainable economic growth of the region.

In this plan ‘Key Priority Areas’ have been identified – locations with the highest levels of air pollution near major roads and areas with heavy traffic in towns and cities – where most work will be focused.

Key Performance Indicators (KPIs) have been set to help track and measure actions:

Reduce traffic: for example, by encouraging travellers to switch from cars to use public transport, cycle and walk more;

Increase efficiency: improving traffic flow by reducing congestion and stop-start travel to decrease air pollution peaks and to lower emissions overall; and

Improve fleet: by encouraging the replacement of older, more polluting vehicles with newer, smaller, cleaner, lower-emission vehicles.

Actions in the Air Quality Action Plan have been divided into seven main areas:

Development management and planning regulation: including standardisation of regulation and policy across Greater Manchester;

Freight and HGVs: to reduce emissions associated with the movement of freight and goods by road;

Buses: buses have a vital role to play in public transport. New legislation and the development of Greater Manchester's 2040 transport strategy will assist in growing bus usage and improving vehicle standards;

Cycling: building on existing strategies and initiatives to encourage cycling as an attractive and convenient way to travel;

Travel Choices: encouraging the public and businesses to make sustainable travel choices is essential in improving air quality

Cars: measures to reduce emissions from cars and reduce the number of vehicle trips can make real improvements; and

Information and resources: education and providing information to the public, businesses and policy makers is vital in bringing air quality improvements.

The following section of the report lists out each of the relevant Actions contained within the Action Plan and gives an indication of how the proposed strategy for 28 – 30 Oldham Street has considered and attempted to address each of the action.



Actions for Managing New Development

Action No.	Council Statement	28 - 30 Oldham Street Team Response
1.1	Construction Management Guidance: Greater Manchester (GM) councils to adopt the IAQM Guidance on the Assessment of Dust from Demolition and Construction sites. i. Where a key priority area is affected by a proposed scheme, a high level of mitigation control will be requested	The Appointed Contractor will be contractual obliged to; • Implement best practice pollution prevention policies and procedures on-site in accordance with Pollution Prevention Guidelines, Working at construction and demolition-sites: PPG61 • Sign up to the Considerate Constructors Scheme and achieve 35/50 as a minimum • Appoint an onsite sustainability champion to monitor, record and report all onsite targets
1.2	Development Planning Guidance: GM councils to adopt the most recent IAQM air quality planning guidance, to help ensure that planning applications consider impacts consistently, and opportunities to improve air quality are realised. 1. Where a Key Priority Area is significantly adversely affected by a proposed scheme, a high level of mitigation control will be requested. 2. The IAQM/EPUK guidance will also be used to screen and assess industrial sources, such as boilers or large stationary engines. GM local authorities to recommend mitigation controls in accordance with the most recent guidance and the other actions in this document for new developments that contribute to a deterioration of air quality in Air Quality Management Areas (AQMAs). Where an air quality assessment is triggered, it should include a review of monitoring data. Where monitoring is not currently undertaken, it may be requested to inform the application or to confirm the effects.	The Engineering scheme has given consideration to minimising emissions from primary plant items and for making sure the air quality internally is not adversely impacted by the surrounding air quality; • Boilers for heating – Nox emissions are below 44mg/kWh • Boilers for hot water – Nox emissions are below 44mg/kWh • CHP – Nox emissions is 76mg/kWh. • Emergency generators are 2900mg/Nm3 (and proposed to operate for around 10-15mins per month as part of their planned preventative maintenance)
1.3	Cumulative Development Database: A centralised database of planning applications and air quality assessments will be managed by TfGM, to better understand and manage the cumulative effects of several developments. This action would complement: • 1.2 Development Planning Guidance • 2.1 Delivery and Servicing Plan Toolkit, to coordinate the effects of increased traffic flows.	This building is being developed independently to any surrounding buildings and development.

Actions for Managing New Development



Action No.	Council Statement	28 - 30 Oldham Street Team Response
1.4	Clean Air Zone Appraisals: TfGM will undertake an appraisal of the effects of charging Clean Air Zones (CAZs) to incorporate the following: 1. Determine the possible appraisal scenarios, considering geographic scope, implementation timeline, political and public acceptability enforcement, and existing/projected vehicle fleet. 2. Local air quality assessment. 3. Health impact assessment. 4. Economic and cost/benefit appraisal. The appraisal will also consider the cumulative and knock-on effects of a CAZ on other areas, such as the potential redistribution of significant components of the fleet into areas outside the controlled zone. It will also be essential to consider the other actions in this Plan, as many could alter the baseline against which the effects of the CAZ would be compared, and many could also affect the implementation of a CAZ directly.	There is no action required for the development under this action point.

Actions for Managing New Development



Action No.	Council Statement	28 - 30 Oldham Street Team Response
1.5	<u>20mph Zones:</u> Review the effects of 20mph zones on air quality.	No action is proposed within this development to instigate a 20MPH zone, but it has been acknowledged this could be reviewed. Refer to the Green Travel Plan included within the Travel Plan and Transport Statement.
1.6	<u>Encouraging Travel Planning:</u> TfGM will work with the local authorities to encourage travel planning measures in businesses and individuals to effect a significant modal shift.	Refer to the Green Travel Plan included within the Travel Plan and Transport Statement. <i>This should be promoting options of reaching the venue by public transport and raising awareness of available public transport and details of a parking management strategy for the hotel. This needs to include a strategy for both guests and staff.</i>
1.7	<u>Taxi & Private Hire Licensing:</u> Seek to standardise the minimum emission requirements for taxis.	This requirement is outside of the remit of the projects proposals.
1.8	<u>Green Infrastructure:</u> Investigate the potential of green infrastructure in improving air quality.	There are Current no proposals for green infrastructure. This is to be re-evaluated at the next stage of design.

Actions for Freight and Goods Vehicles

Action No.	Council Statement	28 - 30 Oldham Street Team Response
2.1	<u>Delivery and Servicing Plan Toolkit</u> Air quality considerations will be incorporated into the DSP Toolkit to reduce HGV/LGV movements, and hence emissions, in the key priority areas. The toolkit is designed to help private and public organisations better manage deliveries. 1. All GM councils will implement the DSP Toolkit at their own sites. 2. The key priority areas for air quality due to freight emissions will be included in the toolkit, to encourage more efficient practices. 3. TfGM will support the use of the DSP Toolkit as best practice at all new development sites.	This requirement is outside of the remit of the projects proposals.
2.2	<u>Urban Distribution Centres</u> Locations for potential distribution centres will be identified in the Greater Manchester Spatial Framework, and where these are proposed to be constructed, they will use travel planning to ensure that local air quality benefits are realised. 1. Low-emission, or ultra-low-emission vehicles, such as EV LGVs, will be used to complete the first/last stage of delivery.	This requirement is outside of the remit of the projects proposals.
2.3	<u>Urban Consolidation</u> The GM councils and TfGM will implement a policy to actively encourage and facilitate consolidation practices for freight deliveries and waste collection, 1. Integrate these into the operators’ travel plans and existing low-emission infrastructure, such as EV charging. 2. The introduction of consolidation centres in new developments will be incentivised through travel planning. 3. The local deliveries from the consolidation centre should be by foot, cycle or EV. 4. All GM councils will stop personal workplace deliveries to council offices to reduce the number of ‘white van’ courier journeys and to support the operation of small parcel consolidation centres.	Procurement of building services, such as waste, food delivery, etc will include appraisal of operators based on their ability to meet these requirements.

Actions for Freight and Goods Vehicles

Action No.	Council Statement	28 - 30 Oldham Street Team Response
2.4	<u>Access for Freight to Key Economic Centres and Sub-regional Freight Facilities</u> Where areas for freight facilities are identified in the GMSF or any local plans, they can be integrated with rail and water routes in order to reduce the numbers of road HGV movements. i. Where these facilities are proposed to be constructed they will use travel planning tools to ensure that local air quality benefits are realised.	This issue sits outside of the remit of the development.
2.5	<u>Freight Information Channels</u> TfGM will identify where mobile, digital and live information channels can be used to improve the efficiency of freight transport by providing accurate and up-to-date information to operators and drivers.	This issue sits outside of the remit of the development.
2.6	<u>Diesel transport refrigeration units (TRUs)</u> TfGM will support the development and uptake of the alternatives to Diesel Transport Refrigeration Units (TRUs) to ultimately achieve zero-emission transport refrigeration.	The AQMS commitment to Zero Emission Transport Refrigeration Units will be part of the selection criteria when procuring support services for the hotel and venue. Diesel transport refrigeration units (TRUs) are effectively unregulated in Europe and, according to forthcoming European Commission regulations, are allowed to emit 29 times as much PM and six times as much NOx than as a modern Euro VI truck. Zero-emission transport refrigeration would eliminate this source of NOx and PM emissions and would deliver substantial and progressively larger reductions in greenhouse gas emissions. Many zero-emission TRUs are also very low noise.
2.7	<u>Engine Idling</u> TfGM will promote anti idling policies with freight transport companies and more widely.	The management regime will prevent delivery vehicles, taxis etc idling during loading / unloading. This will include signage enforcing “No Idling” and clear management processes.
2.8	<u>Alternative Fuels</u> TfGM will work with the local authorities and other city regions with the aim of developing a consistent policy position in relation to alternative fuels and undertaking activities to encourage and facilitate the uptake of appropriate vehicles.	Refer to 6.1 Plugged in Places EV Charging Network

Actions for Cycling

Action No.	Council Statement	28 - 30 Oldham Street Team Response
4.1	<u>Consolidated Cycle Actions</u> Improvements to the cycle networks will focus on providing safe green routes that are suitable alternatives in order to promote travel by less polluted routes and to reduce the number of vehicle movements in the key priority areas.	This issue sits outside of the remit of the development.
4.2	<u>Public Cycle Hire</u> Explore the feasibility of public cycle hire facilities in urban centres, with hire points located near transport hubs and major journey destinations.	Refer to the Green Travel Plan for details.
4.3	<u>Cycle Logistics</u> TfGM will encourage and promote a logistics programme to use cycle or electrically-assisted cycles for short distance deliveries and distribution in urban centres.	Details of delivery firms and bike rentals that incorporate electrically assisted cycles would be promoted within the Hotels Travel information. Electrical charging points will be available to staff in the bike store area to facilitate the adoption of electrically-assisted cycling.
4.4	<u>Cycling to 2040</u> TfGM will undertake further work to better understand the more innovative options available to further promote cycling and walking, and to explore funding opportunities available. TfGM will set out a clear delivery plan in line with the 2040 transport strategy, to encourage further uptake of cycling and walking.	The hotel would seek to promote cycling and TfGM innovative options to guests, during their stay.

Actions for Travel Choices



Action No.	Council Statement	28 - 30 Oldham Street Team Response
4.1	<u>Car Clubs</u> Appraise the effects of the car clubs that are already in operation and determine how they are affecting pre-existing travel choices (i.e. effects on the modal shift): 1. Use this appraisal information to introduce new clubs, or expand the existing schemes to provide access in all districts. 2. Car clubs will be required to operate a high proportion of EVs.	This issue sits outside of the remit of the development.
4.2	<u>Dynamic Road Network Efficiency and Travel Information System</u> The following travel information systems actions will be undertaken: Travel choice messages will be included on the VMS and messaging systems in order to promote alternative travel options. Pollution events and health advice will be posted on the VMS and messaging systems so that vulnerable people will be able to make an informed decision about how they want to travel and to avoid options or routes that may exacerbate health effects.	Refer to the Green Travel Plan for details. Travel Choice Messages and Pollution Events could be displayed in the reception area for guests to plan journeys using public transport.

Actions for Car

Action No.	Council Statement	28 - 30 Oldham Street Team Response
6.1	<u>Plugged-in Places EV Charging Network</u> Continue to increase the number of EV charging points through the Plugged-in-Places programme: 1. Additional national funding opportunities will be identified. 2. Provision of EV charging in residential and commercial developments will be encouraged through planning control and regulation as a means of mitigating local air quality effects and supporting the Low-Emission Strategy (see Section 6.2 Development Planning Guidance). 3. Investigate options to provide better signage, marketing and location information for charging points.	The landscaping around the site prohibits the opportunity to introduce EV Charging Points for either Guests or Public. However, electrical charging points will be available to staff in the bike store area to facilitate the adoption of electrically-assisted cycling.
6.2	<u>Car Use Allowance</u> Discourage the use of private cars for business use. 1. Work with local authorities to review private car use for local authority staff business journeys, with a particular focus on those journeys outside of their district. 2. A sustainable travel hierarchy to be implemented to encourage alternatives to car travel.	Refer to the Green Travel Plan for details. Promote public transport and cycling for staff; this includes a plan for out of hours commuting for hotel staff.
6.3	<u>Local Authority Parking Charges</u> Work with local authorities to review the introduction of parking charges at local authority offices to discourage non-low emissions private car use in favour of public transport.	This issue sits outside of the remit of the development.

Actions for Information and Resources

Action No.	Council Statement	28 - 30 Oldham Street Team Response
7.1	<u>Website and Online Resources</u> The GreatAir Manchester website will become the responsibility of TfGM: 1. TfGM will invest greater resources to improve the website to help support and publicise the air quality Actions. 2. Include education resources for users and schools, with links to travel planning and health responses (see Pollution Event Response Actions).	This issue sits outside of the remit of the development.
7.2	<u>Online Route Finding</u> The major providers of online mapping and travel information (e.g. Google, Bing) will be contacted to ensure that the best available data is being used and updated frequently in order to promote alternative travel choices in the region.	The hotel and restaurant will be identified on Google, etc's databases as a verified site to assist with online route finding.
7.3	<u>Pollution Alert</u> Email and text alert service will be launched to warn the public about pollution events and provide advice if evidence supports implementation. i. The alerts will incorporate advice for individuals to minimise exposure, such as travel choices.	This Pollution Alert warning could be available in the reception area, as set out in 4.2 Travel Information System
7.4	<u>Evaluate the Health Impacts of Poor Air Quality</u> Assess the burden of disease associated with poor air quality in Greater Manchester. i. The study will be essential to provide good evidence of the need to improve air quality and ensure that public information and health advice is accurate and appropriate.	This issue sits outside of the remit of the development.
7.5	<u>Contingency Response Plan</u> Publish a contingency response plan for periods of high pollution episodes in association with Public Health (local authority Public Health and Public Health England).	A contingency plan will be created in association with the local authorities and GMHSCP, and integrated with the public messaging systems so that the NHS is prepared for increased activity. The contingency plan will need to be integrated with the following actions: • 2.5 Freight Information Channels • 5 Travel Choices • 7.1 GreatAir Manchester Website • 7.3 Pollution Alert • 7.4 Evaluate the Health Impacts of Poor Air Quality.
7.6	TfGM Air Quality Team TfGM will employ staff resource with responsibility to provide support for key local authority roles, and to investigate the feasibility of transferring some air quality responsibilities along with some resources to drive the proactive delivery of the Action Plan.	This action sits outside of the remit of the development

Actions for Information and Resources



Action No.	Council Statement	28 - 30 Oldham Street Team Response
7.7	<u>Air Quality Monitoring Database</u> TfGM will create a database of air quality monitoring data for Greater Manchester. Project-specific data reported for significant planning applications will be collated and included in the database. Coordination of data sharing/planning with Highways England will be formalised to ensure that the monitoring near the Strategic Road Network is also collated.	Refer to the Travel Plan regarding collaboration with Highways England monitoring or GM Local Authority for any monitoring.
7.8	<u>Traffic Flow Data</u> Undertake Automatic Number Plate Recognition (ANPR) measurements on roads in the Key Priority Areas to determine the composition of the existing vehicle fleet: 1. Project the fleet composition forward to future baseline years. 2. Make the information available to local authorities and consultants so that accurate and consistent fleet projections are used when appraising new schemes. 3. TfGM will work with Highways England and Greater Manchester Police to prepare a joint bid for the expansion of the ANPR network across Greater Manchester.	This issue sits outside of the remit of the development. Refer to the Travel Plan regarding collaboration with Highways England monitoring or GM Police for any monitoring.

Summary of Mitigation Measures

The environmental strategy for the proposed development has given much consideration to minimizing air pollution external and internal to the development;

- Highly efficient, low NOx emitting heating and hot water sources will be specified;
 - Boilers for heating – Nox emissions are below 44mg/kWh
 - Boilers for hot water – Nox emissions are below 44mg/kWh
 - CHP – Nox emissions is 76mg/kWh.
- Mechanical ventilation (with Heat Recovery) with openable windows. This whole house ventilation system manages the air quality internally, yet the openable windows allow occupant control for ‘fresh’ air.
- Filters in the heat recovery system help maintain good levels of Indoor air quality. The grade of filter is to be confirmed at detailed design stage.
- The landscaping around the site prohibits the opportunity to introduce EV Charging Points for either Guests or Public. However, electrical charging points will be available to staff in the bike store area to facilitate the adoption of electrically-assisted cycling.

Appendix A



Appendix A contains technical information for the potential engineering systems for 28–30 Oldham Street. All of the potential systems will be low NOx emitting systems in line with the Air Quality Management Strategy.

NOTE: Should alternative engineering systems be specified, they must be low NOx emitting and in line with the Air Quality Management Strategy.

boom collective



January 2014

MAXXflo

High Efficiency Condensing Stainless Steel Storage Water Heaters

Brochure and Specification Sheet



Working towards
a cleaner future



MAXXflo

High Efficiency Condensing Stainless Steel Storage Water Heaters

The MAXXflo range of condensing stainless steel water heaters from Andrews Water Heaters offer a revolutionary concept in self contained, storage water heating for commercial applications. Featuring stainless steel tanks, these high efficiency units incorporate a fully modulating burner function to provide maximum performance combined with economic running costs. Heat input and water flow are carefully regulated to produce a closely controlled water temperature and our design principle affords protection against Legionella bacteria. Virtually instantaneous hot water is available since the heat exchanger is sited externally to the storage tanks.

Condensing Stainless Steel Storage Water Heaters

The MAXXflo range of stainless steel condensing storage water heaters provide numerous solutions for both commercial and industrial applications. The range consists of nine models with tank options of 200 or 300 litres capacity and a choice of four outputs from 30 to 120kW.

The small footprint and multiple flue options provide greater flexibility when siting the unit.

The high efficiency heat exchanger, modulating burners and tank design allow the heater to generate hot water in the condensing mode up to 80% of the tank volume producing an efficiency of 109%.

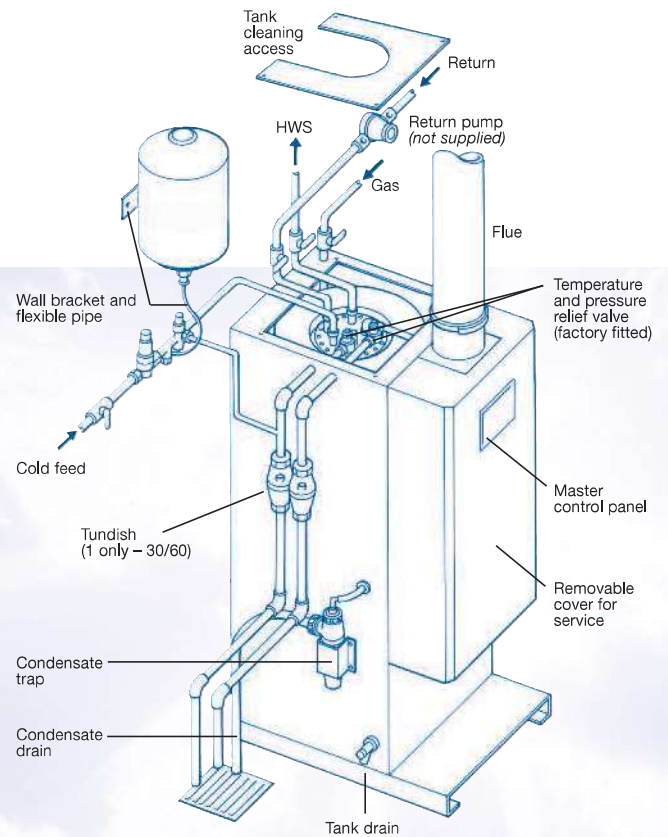
The water heaters can be installed as room-sealed balanced flue appliances using concentric flue components supplied by Andrews Water Heaters. Alternatively conventional flue components can be used (suitable for condensing appliances) giving a longer flue run.

A digital electronic master controller operates the pre-mix fully modulating gas burners fitted to each of the heater modules. The tank temperature, up to 70°C, is set on the master control. Building Energy Management System (BEMS) and other external interfaces are provided.

Standard MAXXflo Features

- Integral 200 or 300 litre stainless steel tank
- Condensing, 109% net efficiency
- Pre-mix modulating gas burner(s)
- Single bottom drain
- Large clean out opening in tank top
- Variable speed pump(s)
- Room sealed or conventional flue
- State of the art electronics with diagnostics
- Built-in high temperature anti-Legionella programme
- The secondary pump can be powered via the heater
- BEMS interface.
- Additional 200 and 300 litre stainless steel storage tanks available
- Energy Technology Listed (ECA)
- WRAS approved

Typical Installation

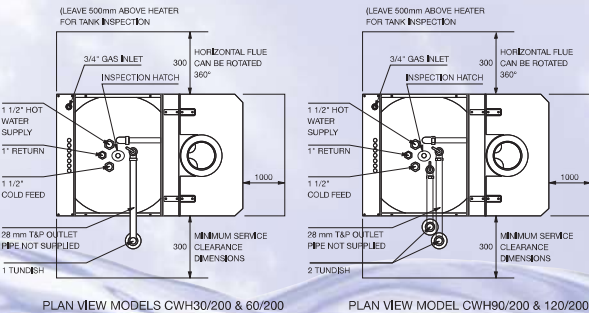
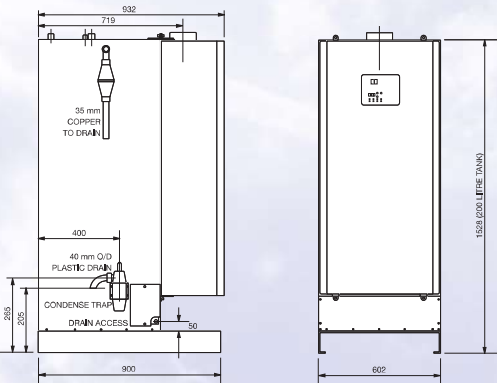


An unvented mains feed kit (28mm dia) can be supplied with all MAXXflo models. The kit comprises a combined strainer/pressure reducing valve set to 3.5 bar, check valve assembly, expansion valve set to 6.0 bar, 25 litre expansion vessel and tundish. The combined temperature/pressure relief valve(s) is factory fitted.

The water heater tank temperature can be set between 40°C and 70°C by using the + or - buttons on the master controller.

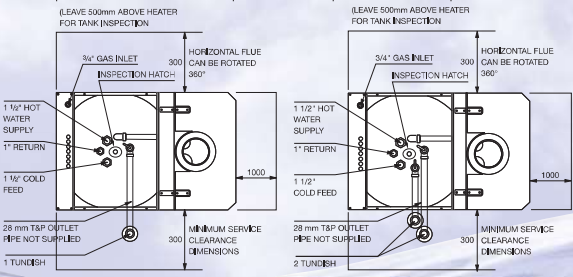
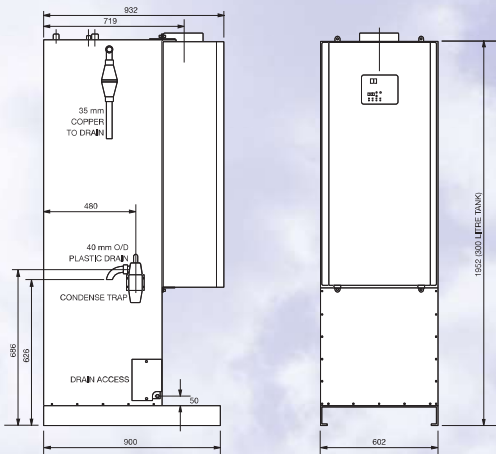
Dimensions:

MAXXflo CWH30/200, CWH60/200,
CWH90/200 & CWH120/200



Dimensions:

MAXXflo CWH30/300, CWH60/300,
CWH90/300 & CWH120/300

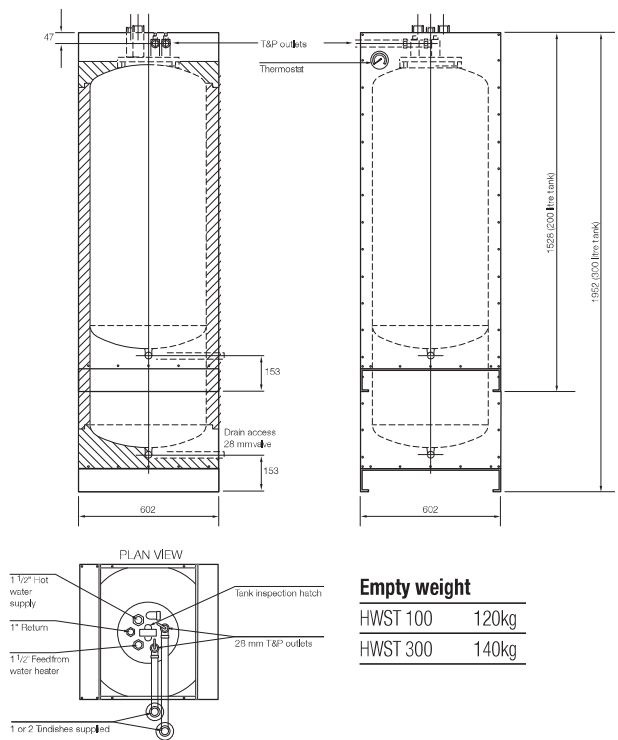


PLAN VIEW MODEL CWH30/300 & 60/300

PLAN VIEW MODEL CWH90/300 & 120/300

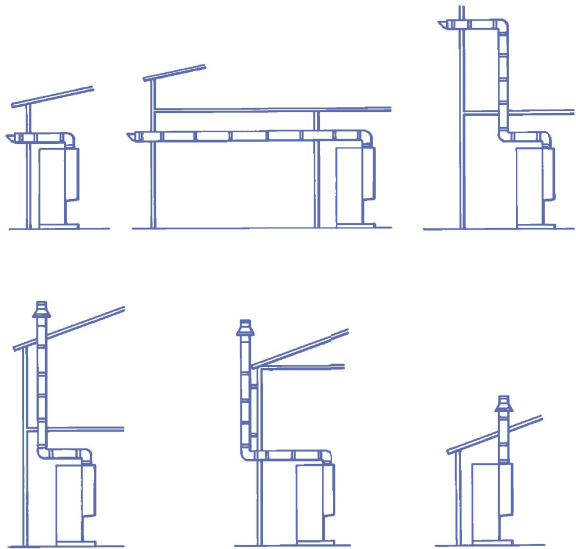
HWST Tank Dimensions

HWST 200 HWST 300 STORAGE TANKS



Flue Systems

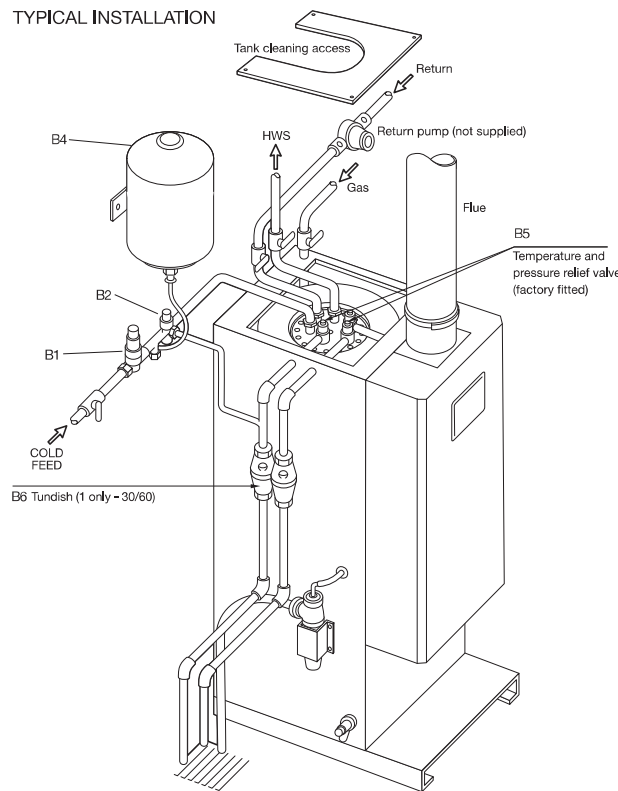
Heaters can be used with concentric flue to provide a room sealed application. Refer to installation manual and price list for approved flues from Andrews. Alternatively if a conventional flue system is used the flue must be suitable for condensing appliances. Please contact our sales department for further details.



Unvented Systems Kit installation details

MAXXflo water heater CWH30/60/90/120

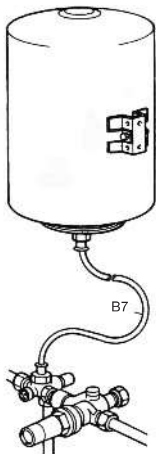
TYPICAL INSTALLATION



Complete Unvented Systems Kit Part no. B328 - MAXXflo

Description	Andrews Part No	Size
B1 Combined Reducing Valve/Strainer	C784	1" BSP
B2 Check Valve and Manifold	C785	1" BSP
B3 Expansion Valve	C786	3/4" BSP
B4 Expansion Vessel (25 Litre) c/w Wall Bracket	C782	3/4" BSP
B5 Temperature/Pressure Relief Valve (factory fitted)	C380 (1 or 2)	1" BSP
B6 Tundish from Expansion Valve & T/P Valve (supplied with heater)	C384 (1 or 2)	1 1/4" BSP
B7 Hose Assembly	C788	

NB: Tees, elbows, stop valve and pipework not supplied



Specification

Model Reference CWH		30/200	60/200	90/200	120/200
		30/300	60/300	90/300	120/300
Input gross Hs min/max	kW	6.7–31.1	13.4–62.2	20.1–93.3	26.8–124.4
Input nett Hi min/max	kW	6.0–28.0	12.0–56.0	18.0–84.0	24.0–112.0
Output (tank set point = 60°C) min/max	kW	6.5–30.5	13.0–61.0	19.5–91.6	26.0–122.1
Natural Gas, G20					
Gas Consumption	m³/h	2.96	5.93	8.89	11.85
Minimum Dynamic Gas Supply Pressure	mbar	20	20	20	20
Propane, G31					
Gas Consumption	kg/h	2.18	4.35	6.53	8.71
Minimum Dynamic Gas Supply Pressure	mbar	37	37	37	37
Efficiency (gross)	%	98	98	98	98
Efficiency (nett)	%	109	109	109	109
Standby Heat Loss	Mj per month	780	780	780	780
Condense Rate	l/hr	3	6	9	12
Condense Trap Size	mm	40	40	40	40
NO _x level @ 0% O ₂	ppm	25	25	25	25
NO _x level @ 0% O ₂	mg/kWh	44	44	44	44
Noise level	dBA	51	51	51	51
Ionisation current – max	µA	6.0	6.0	6.0	6.0
Ionisation current – min	µA	4.0	4.0	4.0	4.0
HSI resistance	kΩ	1.0 – 1.4	1.0 – 1.4	1.0 – 1.4	1.0 – 1.4
Max recovery thru 50°C	ltrs/h	480	960	1440	1920
Max recovery thru 56°C	ltrs/h	429	856	1284	1712
Flue size (concentric) Internal/External	mm	80/125	80/125	130/200	130/200
Flue Size (conventional)	mm	80	80	130	130
Max flue run – concentric	m	14	12	14	14
Max flue run – conventional	m	50	20	50	40
Max flue static pressure	Pa	140	140	140	140
Inlet/Outlet connections	BSP	1½"	1½"	1½"	1½"
Return connection	BSP	1"	1"	1"	1"
Nominal operating water pressure	bar	3.5	3.5	3.5	3.5
Maximum water pressure	bar	6.0	6.0	6.0	6.0
Minimum water pressure	bar	1.0	1.0	1.0	1.0
Gas connection (gas cock supplied)	BSP	¾"	¾"	¾"	¾"
Electrical supply	V/Hz	230/50	230/50	230/50	230/50
Power consumption	W	170	340	510	680
Depth	mm	900	900	900	900
Width	mm	602	602	602	602
Height (200 litre)	mm	1528	1528	1528	1528
Height (300 litre)	mm	1952	1952	1952	1952
Weight – empty (200 litre)	kg	155	170	185	200
Weight – empty (300 litre)	kg	165	180	195	210
Weight – full (200 litre)	kg	355	370	385	400
Weight – full (300 litre)	kg	465	480	495	513
Shipping weight (200 litre)	kg	178	193	208	213
Shipping weight (300 litre)	kg	188	203	218	233
Shipping depth	mm	1040	1040	1040	1040
Shipping width	mm	880	880	880	880
Shipping height (200 litre)	mm	1653	1653	1653	1653
Shipping height (300 litre)	mm	2077	2077	2077	2077

* Noise level measured at 2m from flue terminal

** Reduce flue length by 1.2m for 90° bend, 0.7m for 45° bend and 1.5m for condensate trap

*** Reduce flue length by 4m for 90° bend, 2m for 45° bend and 4m for condensate trap



Panel display



Top view of heater

The MAXXflo range features stainless steel tanks with external heat exchanger(s) and fully automatic electronic control with BEMS interface as standard.

The heaters must be installed with a minimum water pressure of 1 bar. It is recommended that the MAXXflo water heater is installed in conjunction with a suitable base exchange type water conditioner in areas of hard water.

The heaters are factory fitted with temperature and pressure relief valve(s). A gas cock, water draw-off cock and comprehensive instruction manual are also included. The water heaters can be fitted with concentric flue for room sealed applications; horizontal or vertical flue kits must be ordered separately – see manual.

Conventional flue, suitable for condensing applications can be used if the plantroom is ventilated.



RS 33961

PART OF BDR THERMEA

Baxi Commercial
Wood Lane, Erdington,
Birmingham B24 9QP

Sales:

Technical:

0845 070 1056 0845 070 1057



Email: andrews@baxicommercialdivision.com
www.andrewswaterheaters.co.uk



REMEHA R-GEN 5.0 SENERTEC DACHS

TECHNICAL SPECIFICATION SHEET

This is a quick reference specification sheet, full details can be found at remeha.co.uk

May 2017

PERFORMANCE	
Fuel	Natural Gas
Load	100%
Electrical output ⁽¹⁾ (kW)	5
Electrical efficiencies (H _i / H _e)	26% / 23%
Thermal output ⁽²⁾ (kW)	14.6
Thermal efficiencies (H _i / H _e)	74% / 67%
Total efficiencies (el.+Th.) (H _i / H _e)	100% / 90%
Power Performance coefficient	0.34
Fuel input ⁽³⁾ (kW)	19.6
Gas volume flow (m ³ /h)	1.87
Seasonal space heating energy efficiency	156%
Annual energy consumption (kWh / GJ)	7487 / 27
Operation	On/off condensing
ENGINE	
Type/stroke	Lean burn gasoline engine / 4
Number of cylinders	1
Speed (RPM)	2450
Service intervals (Running hours)	3500
ELECTRICAL	
Voltage (V)	400
Frequency (Hz)	50
Own use Auxiliary demand (kW)	0.09
Generator type	Asynchronous
Grid application type	G83/2
Grid system type	TN-S
Circuit breaker	C
NOISE	
Sound pressure (1m) (max./min.) dB(A)	54
Sound power level L _{WA} indoors (dB)	69
DIMENSIONS AND WEIGHT	
Unit	Module without controller
Width (mm)	720
Depth (mm)	1070
Height (mm)	1200
Weight (kg)	530

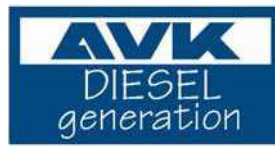
SERVICE SPACE	
Side (mm)	600
Front (mm)	600
Rear (mm)	350
EFFICIENCY CLASS	
ErP ⁽⁴⁾	A+++
CONNECTIONS	
Exhaust (DN in mm)	80
Flow (Inches)	1"
Return (Inches)	1"
Gas (Inches)	1/2"
Condensate (Inches)	1/2"
PRESSURES	
System Working Pressure min. (bar)	1
System Working Pressure max. (bar)	3
CHP Safety Valve Fitted (bar)	3
Gas pressure min. (mbar)	15
Gas pressure max. (mbar)	24
EMISSIONS	
BREEAM NO _x Emission (mg/kWh)	1
Grid NO _x Emission (mg/kWh)	617
Electrical (mg/kWh)	839
Thermal (mg/kWh)	76
COMBUSTION AIR	
Mass flow (kg/h)	37
Volume flow (m ³ /h)	On application
FLUE GAS	
Waste gas mass wet (kg/h)	40.8
Waste gas mass dry (kg/h)	On application
Waste gas volume wet (m ³ /h)	33
Waste gas volume dry (m ³ /h)	27

(1) According to DIN ISO 3046, measured at the generator terminals. Values may differ depending on altitude, environmental conditions and conditions of use.

(2) Values from type/component test report for a return temperature of 30°C with integrated condensing unit; maximum supply flow temperature 83°C, maximum return flow temperature 70°C.

(3) Values from type/component test report for a return flow temperature of 60°C according to Hi, tolerance ±5%.

(4) Calculation according to EN 50465:2015 with Remeha packages with temperature controller. Information correct on the date of publishing.



AVK/JOHN DEERE/GENERATORS

20-440kVA

AVK/John Deere Diesel Generators from 20-440kVA

AVK/John Deere Diesel Generators

From 20 to 440kVA, AVK | SEG (UK) LTD can supply you with a quality, reliable power source to accompany your project. Over this power range we can supply you with a set configured to your specifications, our scope of work normally includes the installation and commissioning of your power plant with full project management.

Design Specifications

The AVK/John Deere range of complete power units are built to a high quality, very reliable, and have a long life. The sets are of a compact design which are easy to start and full maintenance is available. Every generating set is subjected to a comprehensive test program which includes full load testing, checking and proving of all control and safety shutdown functions. The sets are quality engineered and available with a wide range of options and accessories including acoustic close fit canopies, or on road trailers.

Modularity and Protection

Simplicity and adaptability: this is the assurance AVK | SEG (UK) LTD offer you in these modular sets. It is particularly easy to add electrical options by standardised modules, with an optimised layout of the control equipment, as well as increased accessibility for maintenance.



Electrical Panel

From 16kVA upwards, all generator sets can be equipped with the MICS Telys. This monitoring/control panel incorporates all the controls, safety devices and display of the states of the set. It covers all alternator voltages from 208V to 600V (3-phase), irrespective of battery voltage, frequency, current and engine power output.

With a very user-friendly man-machine interface, it is possible to have over 150 configuration parameters, accessible in read only in order to monitor the set's operating state, or by access code for modification. In addition, the MICS Telys has a new wiring concept, permitting the connection of options via an array of marked connectors.

(Please request our MICS Telys Control or MICS Kerys Control leaflets for further information.)

Quality Standards

The equipment meets the following standards: VDE0530, BS4999, BS5000, IEC34. The genset is manufactured by a full accredited ISO9001 TUV CERT.

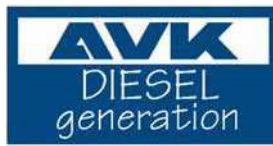
Canopies & Containers

A standard range of modular Eurosilent Canopies are available for system ratings from 7-800kVA with typical noise levels of 70-75dBA @ 7m. The close fit canopies offer a compact solution for external generation equipment. A base frame fuel tank is included.

For larger genset ratings ISO based container solutions are available. For special applications to meet low noise levels or combined housings for multiple engine sets, extended fuel storage etc AVK | SEG (UK) LTD can provide bespoke engineered housing or drop over canopy solutions to meet site and project requirements.

(Please request our Canopied Generators or Containerised Generators leaflets for further information.)

For more information on our full range of Diesel Generators and UPS systems or for a full quotation, please telephone AVK | SEG (UK) LTD on 01628 503900.



AVK/JOHN DEERE/GENERATORS

20-440kVA

Specification

3-PHASE GENSETS													
Genset Type	Genset Specifications 50Hz 400/230V			Engine Specifications					Alternator		Compact Version		
	kVA Cos φ 0.8		Engine	Engine type	Cyl	Bore (mm)	Stroke (mm)	Cyl (L)	Brand	Type	Dimensions LxWxH (m)	Weight (kg) ⁽³⁾	
	PRP ⁽¹⁾	ESP ⁽²⁾											
J22	20	22	6.3	3029DF120	3L	106	110	2.9	MA	ECO281L/4	1.70x0.89x1.22	720	
J33	30	33	6.3	3029DF120	3L	106	110	2.9	MA	ECO28VL	1.70x0.89x1.22	740	
J44K	40	44	10.1	3029TF120	3L	106	110	2.9	MA	ECO32-3S	1.70x0.89x1.22	820	
J66K	60	66	14.5	4045TF120	4L	106	127	4.5	LS	432M45	1.87x0.99x1.36	1000	
J77K	70	77	14.5	4045TF120	4L	106	127	4.5	LS	432L65	1.87x0.99x1.36	1110	
J88K	80	88	16	4045TF1220	4L	106	127	4.5	LS	432L8	1.87x0.99x1.36	1110	
J110K	100	110	19	4045HF120	4L	106	127	4.5	LS	442VS45	1.95x1.08x1.33	1240	
J130K	120	132	24	6068TF220	6L	106	127	6.7	LS	442S7	2.37x1.11x1.48	1570	
J165K	150	165	29	6068HF120-153	6L	106	127	6.7	LS	442M95	2.37x1.11x1.48	1640	
J200K	182	200	36.1	6068HF120-183	6L	106	127	6.7	LS	462M3	2.37x1.11x1.48	1730	
J220K	200	220	36.9	6068HF475	6L	106	127	6.7	LS	462M5	2.37x1.11x1.48	1790	
J275K	250	275	-	6081HF001	6L	116	129	8.1	LS	462L6	2.90x1.30x1.70	2170	
J300K	275	303	46.1	6081HF001	6L	116	129	8.1	LS	462L9	2.90x1.30x1.68	2235	
J400K	365	402	76	6125HF070	6L	127	165	12.5	LS	472VS2	3.16x1.34x1.79	3090	
J440K	400	440	76	6125HF070	6L	127	165	12.5	LS	472VS3	3.16x1.34x1.79	3120	

(1) PRP: Prime Power – Continuous duty 24/24H under variable – 10% overcharge acceptable 1h/12h (ISO 8528 PRP) (2) ESP: Standby Power – Standby duty – Operation under variable charge 500h/year without overcharge – For continuous use, derated by 10% (ISO 8528) Ratings are given for a 25°C ambient temperature. Derating, please contact us or refer to data sheet – Alt:100m above sea level. Impossible. (3) Dry weight, without fuel.

Other AVK | SEG (UK) LTD Diesel Generator Ranges:
(information leaflets available on request)



AVK/JOHN DEERE/20-440kVA



AVK/MTU/650-3300kVA



AVK/MITSUBISHI/6.8-44kVA
AVK/MITSUBISHI/1275-2200kVA



AVK/VOLVO/200-700kVA

AVK|SEG (UK) LTD
Power Systems House, Malvern Road, Maidenhead, Berkshire, SL6 7RE
Telephone: 01628 503900 Fax: 01628 503999
www.avk-seg.co.uk email: power.systems@avk-seg.co.uk



DESCRIPTIVE

- Mechanic governor
- Mechanically welded chassis with antivibration suspension
- Main line circuit breaker
- Radiator for wiring temperature of 48/50°C max with mechanical fan
- Protective grille for fan and rotating parts (CE option)
- 9 dB(A) silencer supplied separately
- Charger DC starting battery with electrolyte
- 12 V charge alternator and starter
- Delivered with oil and coolant -30°C
- Manual for use and installation

POWER DEFINITION

PRP : Prime Power is available for an unlimited number of annual operating hours in variable load applications, in accordance with ISO 8528-1. ESP : The standby power rating is applicable for supplying emergency power in variable load applications in accordance with ISO 8528-1. Overload is not allowed.

TERMS OF USE

According to the standard, the nominal power assigned by the genset is given for 25°C Air Inlet Temperature, of a barometric pressure of 100 kPa (100 m A.S.L), and 30 % relative humidity. For particular conditions in your installation, refer to the derating table.

ASSOCIATED UNCERTAINTY

For the generating sets used indoor, where the acoustic pressure levels depends on the installation conditions, it is not possible to specify the ambient noise level in the exploitation and maintenance instructions . You will also find in our exploitation and maintenance instructions a warning concerning the air noise dangers and the need to implement appropriated preventive measures.

J110K

Engine ref.	4045HF120
Alternator ref.	AT00911T
Performance class	G3

GENERAL CHARACTERISTICS

Frequency (Hz)	50
Voltage (V)	400/230
Standard Control Panel	APM303
Optional control panel	TELYS

POWER

Voltage	ESP		PRP		Standby Amps
	kWe	kVA	kWe	kVA	
220 TRI	88	110	80	100	289
220/127	88	110	80	100	289
415/240	88	110	80	100	153
400/230	88	110	80	100	159
380/220	88	110	80	100	167
200/115	88	110	80	100	318
240 TRI	88	110	80	100	265
230 TRI	88	110	80	100	276

DIMENSIONS COMPACT VERSION

Length (mm)	1950
Width (mm)	1084
Height (mm)	1330
Dry weight (kg)	1187
Tank capacity (L)	190

DIMENSIONS SOUNDPROOFED VERSION

Commercial reference of the enclosure	M129
Length (mm)	2554
Width (mm)	1150
Height (mm)	1680
Dry weight (kg)	1587
Tank capacity (L)	190
Acoustic pressure level @1m in dB(A)	78
Sound power level guaranteed (Lwa)	95
Acoustic pressure level @7m in dB(A)	66



J110K

ENGINE CHARACTERISTICS

GENERAL ENGINE DATA

Engine model	JOHN DEERE
Engine ref.	4045HF120
Air inlet	Turbo
Cylinders arrangement	L
Number of cylinders	4
Displacement (C.I.)	4.48
Air coolant	Air/Air DC
Bore (mm) x Stroke (mm)	106 x 127
Compression ratio	17 : 1
Speed (RPM)	1500
Pistons speed (m/s)	6.35
Maximum stand-by power at rated RPM (kW)	100
Frequency regulation (%)	+/- 2.5%
BMEP (bar)	16.24
Governor type	Mechanical

COOLING SYSTEM

Radiator & Engine capacity (L)	20.20
Max water temperature (°C)	105
Outlet water temperature (°C)	93
Fan power (kW)	2.50
Fan air flow w/o restriction (m3/s)	3.70
Available restriction on air flow (mm Water Column)	20
Type of coolant	Glycol-Ethylene
Thermostat (°C)	82-94

EMISSIONS

Emission PM (mg/Nm3)	100
Emission CO (mg/Nm3)	310
Emission HCNOx (g/kWh)	
Emission HC (mg/Nm3)	26

EXHAUST

Exhaust gas temperature (°C)	545
Exhaust gas flow (L/s)	283
Max. exhaust back pressure (mm EC)	750

FUEL

Consumption @ 110% load (L/h)	25.50
Consumption @ 100% load (L/h)	23.50
Consumption @ 75% load (L/h)	16.50
Consumption @ 50% load (L/h)	11.50
Maximum fuel pump flow (L/h)	108

OIL

Oil capacity (L)	13.50
Min. oil pressure (bar)	1
Max. oil pressure (bar)	5
Oil consumption 100% load (L/h)	0.0240
Carter oil capacity (L)	12.50

HEAT BALANCE

Heat rejection to exhaust (kW)	64
Radiated heat to ambient (kW)	10.50
Heat rejection to coolant (kW)	36

AIR INTAKE

Max. intake restriction (mm EC)	625
Intake air flow (L/s)	106



J110K

ALTERNATOR CHARACTERISTICS

GENERAL DATA

Alternator ref.	AT00911T
Number of Phase	Three phase
Power factor (Cos Phi)	0.80
Altitude (m)	0 to 1000
Overspeed (rpm)	2250
Number of pole	4
Capacity for maintaining short circuit at 3 In for 10 s	No
Insulation class	H
T° class, continuous 40°C	H / 125°K
T° class, standby 27°C	H / 163°K
AVR Regulation	Yes
Total Harmonic Distortion in no-load DHT (%)	<2
Total Harmonic Distortion, on load DHT (%)	<5
Wave form : NEMA=TIF	<50
Wave form : CEI=FHT	
Number of bearing	1
Coupling	Direct
Voltage regulation at established rating (+/- %)	
Recovery time (Delta U = 20% transient) (ms)	500
Indication of protection	IP 23
Technology	Without collar or brush

OTHER DATA

Continuous Nominal Rating 40°C (kVA)	100
Standby Rating 27°C (kVA)	110
Efficiencies 100% of load (%)	92.10
Air flow (m3/s)	0.25
Short circuit ratio (Kcc)	0.54
Direct axis synchro reactance unsaturated (Xd) (%)	287
Quadra axis synchro reactance unsaturated (Xq) (%)	172
Open circuit time constant (T'do) (ms)	2211
Direct axis transient reactance saturated (X'd) (%)	12.90
Short circuit transient time constant (T'd) (ms)	100
Direct axis subtransient reactance saturated (X''d) (%)	7.70
Subtransient time constant (T''d) (ms)	10
Quadra axis subtransient reactance saturated (X''q) (%)	16.10
Subtransient time constant (T''q) (ms)	
Zero sequence reactance unsaturated (Xo) (%)	0.39
Negative sequence reactance saturated (X2) (%)	11.95
Armature time constant (Ta) (ms)	15
No load excitation current (io) (A)	0.71
Full load excitation current (ic) (A)	2.24
Full load excitation voltage (uc) (V)	28
Engine start (Delta U = 20% perm. or 50% trans.) (kVA)	264
Transient dip (4/4 load) - PF : 0,8 AR (%)	12.40
No load losses (W)	2317
Heat rejection (W)	6789
Unbalanced load acceptance ratio (%)	

DIMENSIONS

Containment DW

Commercial reference of the enclosure	M129 DW
Length (mm)	2602
Width (mm)	1150
Height (mm)	1900
Dry weight (kg)	2006
Tank capacity (L)	505
Acoustic pressure level @1m in dB(A)	77
Sound power level guaranteed (Lwa)	95
Acoustic pressure level @7m in dB(A)	66

Containment DW 48H

Commercial reference of the enclosure	M129 DW48
Length (mm)	2602
Width (mm)	1150
Height (mm)	1948
Dry weight (kg)	2012
Tank capacity (L)	825
Acoustic pressure level @1m in dB(A)	77
Sound power level guaranteed (Lwa)	95
Acoustic pressure level @7m in dB(A)	66

APM303, comprehensive and simple



The APM303 is a versatile unit which can be operated in manual or automatic mode. Equipped with an LCD screen, the user-friendly APM303 offers high-quality basic functions to guarantee simple, reliable operation and supervision of your generating set. It offers the following features:

Measurements:

phase-to-neutral and phase-to-phase voltages, active power currents, effective power, power factors, Kw/h energy meter
Fuel, oil pressure and coolant temperature levels

Supervision:

Modbus RTU communication on RS485

Reports:

2 configurable reports

Safety features:

Overspeed, oil pressure

Coolant temperatures

Minimum and maximum voltage

Minimum and maximum frequency

Maximum current

Maximum active power

Phase sequence

Traceability:

Stack of 12 stored events

For further information, please refer to the data sheet for the APM303.

TELYS, ergonomic and user-friendly



The highly versatile TELYS control unit is complex yet accessible, thanks to the particular attention paid to optimising its ergonomics and ease of use. With its large display screen, buttons and scroll wheel, it places the accent on simplicity and communication.

The TELYS offers the following functions:

Electrical measurements: voltmeter, frequency meter, ammeter.

Engine parameters: working hours counter, oil pressure, coolant temperature, fuel level, engine speed, battery voltage.

Alarms and faults: oil pressure, coolant temperature, failure to start, overspeed, alternator min./max., battery voltage min./max., emergency stop, fuel level.

Ergonomics: wheel for navigating around the various menus.

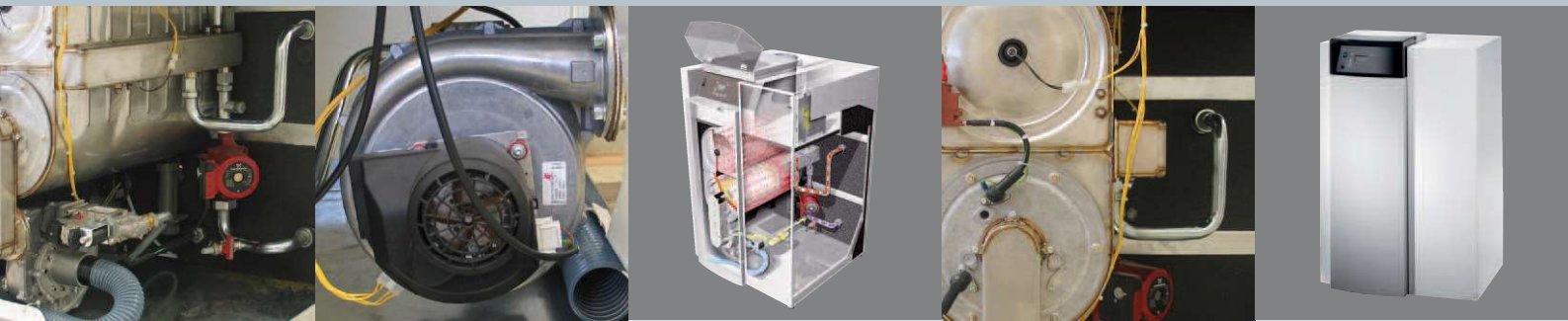
Communication: remote control and operation software, USB connections, PC connection.

For more information on the product and its options, please refer to the sales documentation.

boom collective



Trigon L



Floor standing premix gas fired condensing boilers
with outputs at 65, 85, 100 & 120kW

Feature packed and powerful

Trigon L range of floor standing boilers includes four models with outputs at 65, 85, 100 and 120kW.

Fully condensing and fabricated from durable stainless steel, these appliances return efficiency up to 109.8% with a modulation range up to 6.8:1. Low Noise and low NOx emissions are also prime features of the Trigon L Boiler.

A comprehensive programmable boiler/system controller is included as standard which may be connected to intelligent room controls if desired. As an option, a low loss header can be incorporated into the boiler case as can a plate type heat exchanger to act as a separator to protect the boiler from the possible effects of dirt accumulation in older systems.

The flue connection allows for either room sealed or open type application with the capability for extensive lengths of flue to be accommodated. With the footprint area of the largest model at less than 0.51m², the Trigon L Boilers are frugal on their space requirement making them a perfect choice where space constraints are a key factor in product selection.



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 ELCO UK 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.

Go to **www.elco.co.uk** and download or request a copy of our **Maintenance and Service Solutions** brochure.



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

Standard features

Compact dimensions

With a common height and width of 1088mm and 710mm respectively and depths from 538mm to 718mm, the Trigon L Boilers pack a lot of power into a small space.

Clean and quiet

Utilising state of the art premix combustion technology; NOx emission does not exceed 33mg/kWh thus easily meeting the stringent requirements for the highest BREEAM points score for (low) NOx pollution. The combustion system is also extremely quiet with noise levels not exceeding 48dBA.

Comprehensive controls

Included is a control panel that not only manages the operation of the boiler but in addition, if required can control a heating and a hot water circuit with time and temperature scheduling. Alternatively, external controls by others may interface with and control the Trigon L Boiler.

No need to worry about dirt contamination from old systems

As an alternative to the inclusion of a low loss header within the boiler, the appliance may as an option, be supplied with an in-built plate type heat exchanger. This is an ideal option when utilising the Trigon L as a retrofit unit onto an aged and possibly very dirty existing system. The plate heat exchanger acts as a positive barrier to any contamination of the new boiler from dirt or sludge that may have accumulated in the old network of pipes and radiators.

Weather compensation

If required, for comfort and economy, the boiler may be set to operate with direct-on-boiler weather compensated flow temperatures, thus providing VT heating without the need for any additional system components such as mixing valves etc.

Option of an in-built low loss header

In keeping with modern heating system design characteristics, the typical way of connecting an Trigon L Boiler to a heating system is via a low loss header. If desired, as an option, the boiler may be equipped with an internal low loss header thereby simplifying the installation

Important information with regard to Part L2 of the Building Regulations

Calculated in accordance with the formula given in the Non-Domestic Building Services Compliance Guide (Compliance with Approved Documents L2A & L2B) the Trigon L Boilers have Gross Seasonal Efficiencies of:

Model 65 = 96.48%. Model 85 = 96.66%.

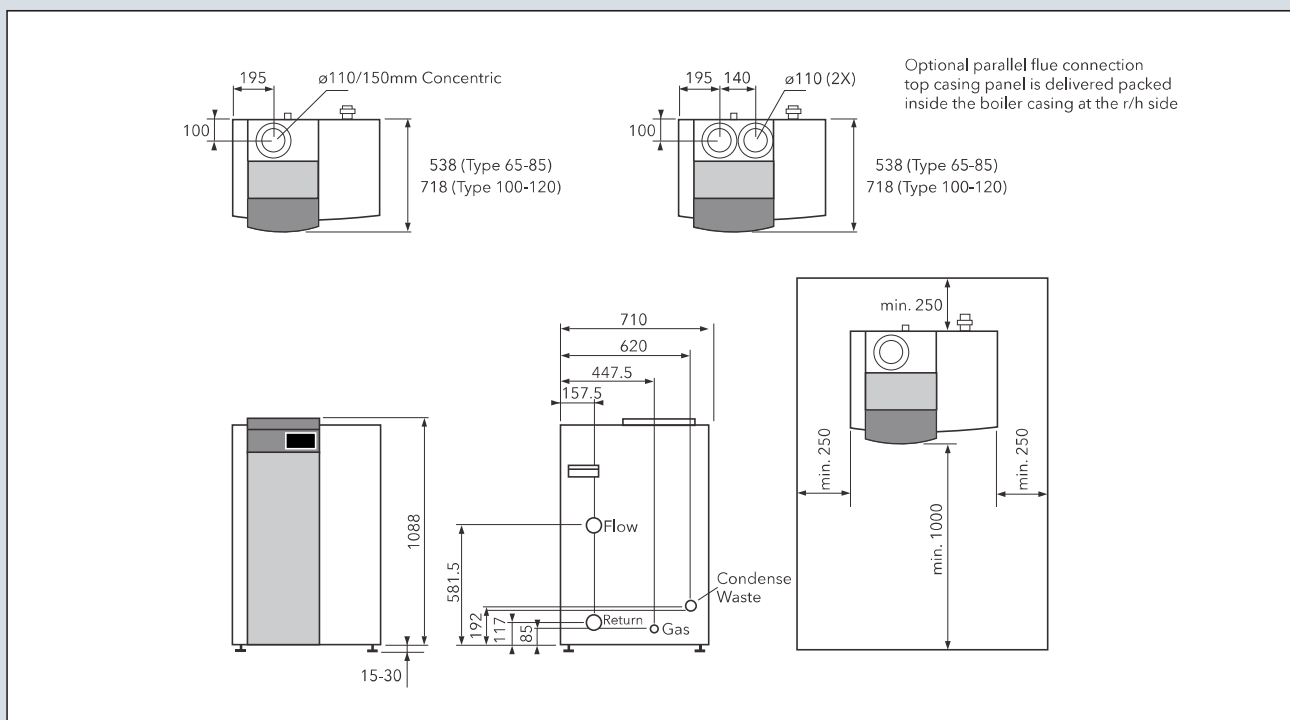
Model 100 = 96.66%. Model 120 = 96.84%.

Warranty

The heat exchanger carries a 5 year guarantee; all other components carry a 12 month guarantee. All guarantees are against manufacturing or material defects only.

Extending your warranty with an ELCO UK Maintenance and Service Plan will ensure long-term optimised heating while minimising your risk of liability beyond the statutory warranty period, and at clearly calculable costs.

Dimensions and clearances



Installation requirements

The Trigon L series of boilers must be installed in accordance with (as appropriate) the relevant requirements of the Building Regulations, Health and Safety Regulation PM5, IEE Regulations, Gas Safety (Installation & Use) Regulations, National Water Bylaws, Clean Air Act, and any Insurance Company requirements

Codes of practice

BS 6880 Code of Practice for low temperature hot water heating systems for output greater than 45kW, Parts 1, 2 & 3: 1988.

BS 6644 2005 +A1 2008. Specification for installation of gas-fired hot water boilers of rated inputs between 70kW (net) and 1.8MW (net) (2nd and 3rd family gases).

IGE/UP/2 Gas installation pipework, boosters 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 Sections B7, B11 and B13.

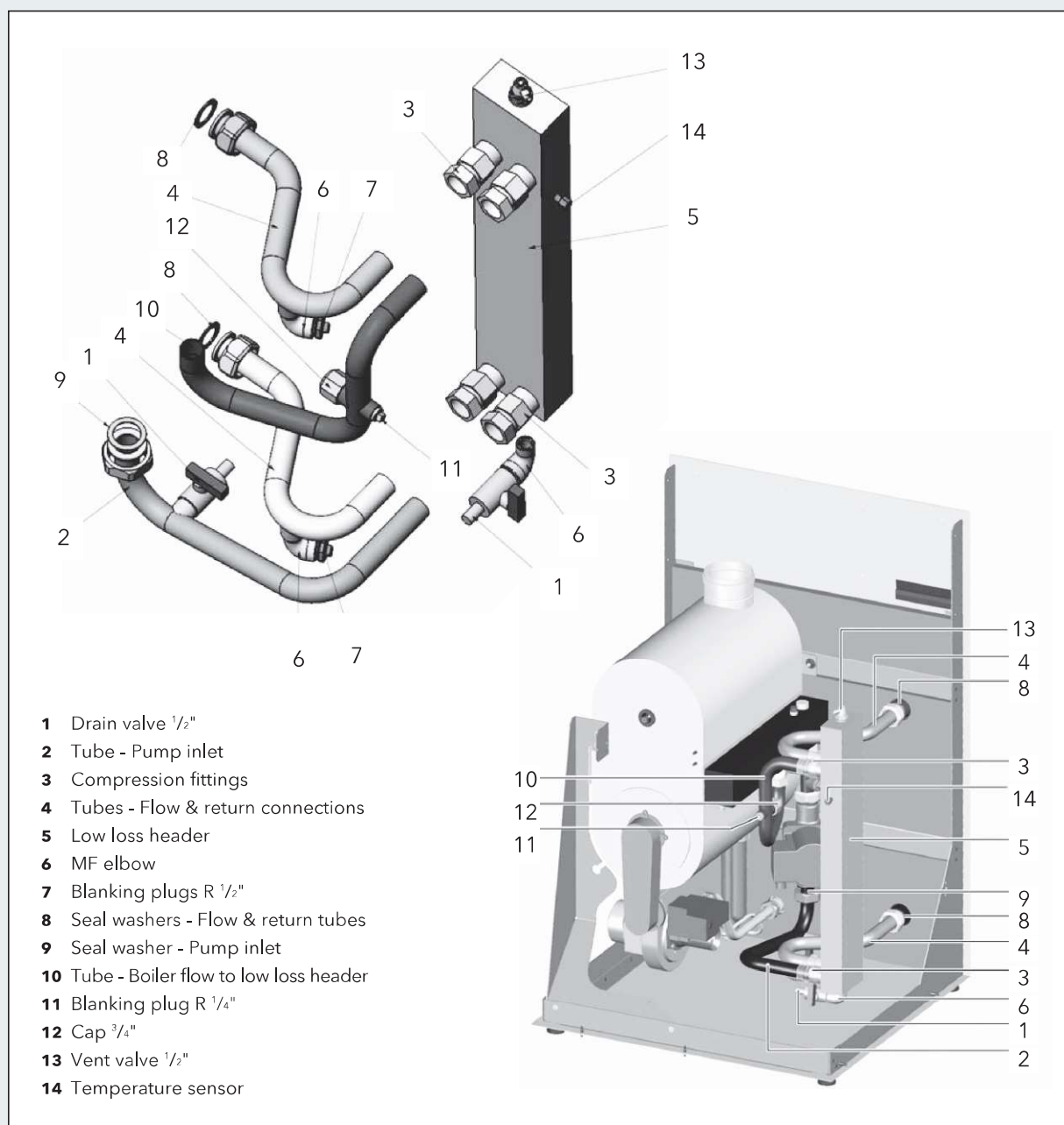
LPG When boilers are fired with LPG it is advisable that gas leakage detection equipment is installed at low level near the boiler/s.

Optional hydraulic kits

The (base version) Trigon L Boiler as in Fig.1 (page 11) is an appliance that includes an in-built pump (with residual head performance as detailed in the Technical Data Table on page 8) and can be (as appropriate) directly hydraulically coupled to the central heating system or via an external local low loss header. To enhance the boiler, optional Hydraulic Kits are available as described below.

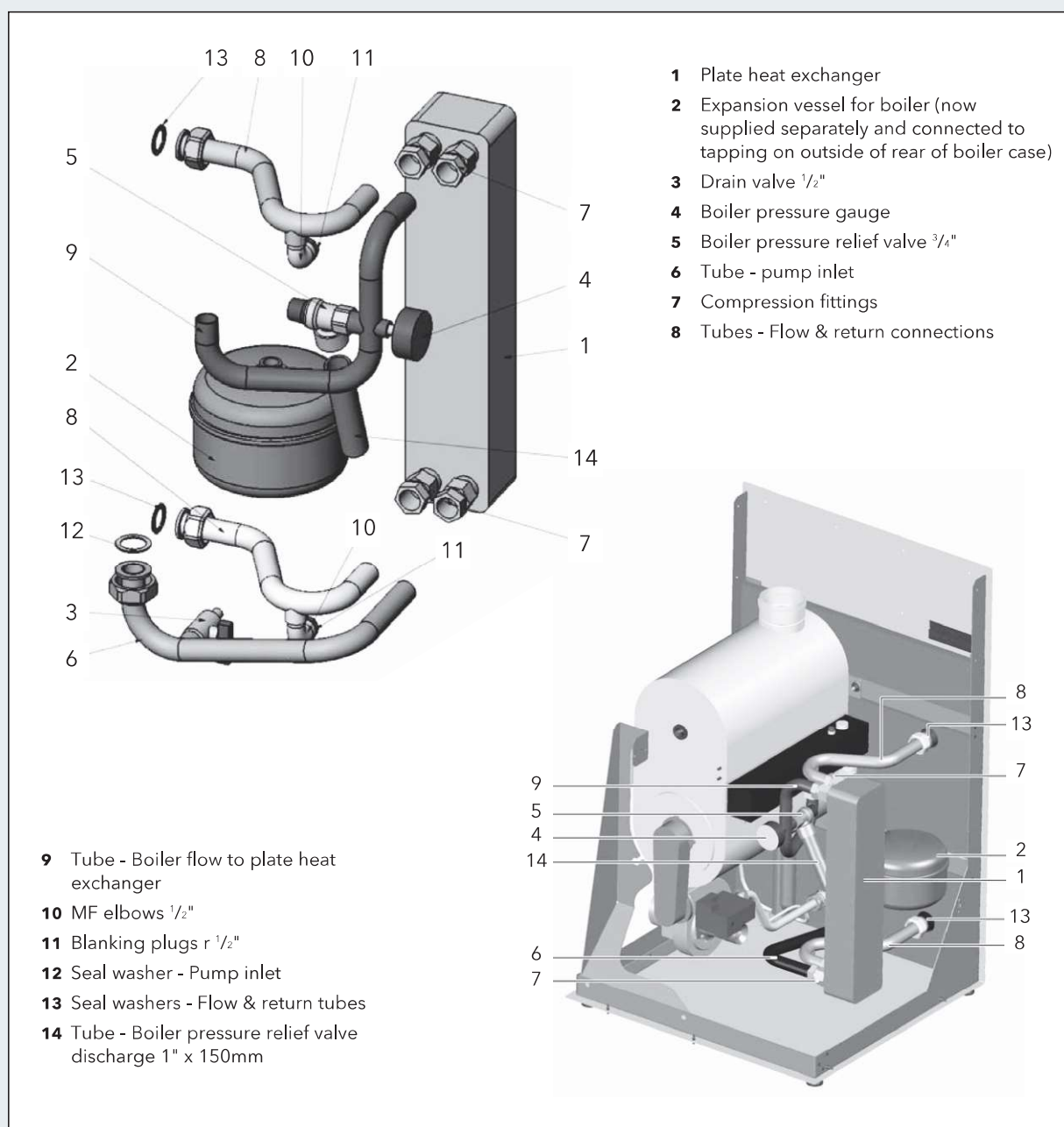
Optional in-built low loss header

This kit provides a neat and speedy solution to the installation of a low loss header; installation time and space saving



Optional in-built boiler protection plate heat exchanger

This option for the Trigon L Boiler is offered for use when the appliance is being used as a retrofit unit onto an aged system where the system may be contaminated with sludge etc which will cause damage to the new boiler if allowed to pass into the heat exchanger or pump etc. This device acts as a barrier to system contaminants, can also act as a pressure break and will also allow this sealed system type product to be applied to an old open vented existing system where there is risk associated with converting the old system to a sealed and pressurised type.



Technical data

Trigon L Boiler Model		L 65	L 85	L 100	L 120
Product Identification Number		0063BQ3008			
Gas Category		112ELL3P / 112H3P			
Nominal Heat Output 80/60°C	kW	8.4 - 60.0	15.6-77.8	17.6-88.2	21.9-109.8
Nominal Heat Output 40/30°C	kW	9.4-65.0	17.0-85.0	19.2-96.3	24.0-120.0
Nominal Heat Input Net	kW	8.6 - 60.7	16.0 - 80.0	18.0 - 90.0	22.5 - 112.4
Energy efficiency ¹ 		A/A	-	-	-
Sound power level	dB(A)	48	-	-	-
Gas Input Natural Gas G20	m³/h	6.28	8.28	9.32	11.65
Gas Input LPG G31	m³/h	2.42	3.2	3.6	4.6
Inlet Gas Pressure G20 Min/Max	mbar	20/25	20/25	20/25	20/25
Inlet Gas Pressure G31 Min/Max	mbar	30/50	30/50	30/50	30/50
Max Fluegas Mass G20	kg/h	111.6	147.6	165.6	208.8
Residual Flue Positive Pressure Max	Pa	230	230	230	230
Max Flow Temperature	°C	85	85	85	85
Water Pressure Min/Max	bar	1.0/3.0	1.0/3.0	1.0/3.0	1.0/3.0
Residual Pump Head (Standard Blr Version)	kPa	11	11	23	15
Flow/Return Connections	BSP	1 1/4"	1 1/4"	1 1/4"	1 1/2"
Gas Connection	BSP	1 1/4"	1 1/4"	1 1/4"	1 1/4"
Flue Connection Concentric	mm	110/150	110/150	110/150	110/150
Flue Connection Parallel	mm	2 x 110	2 x 110	2 x 110	2 x 110
Condense Waste Connection Tail	mm	25	25	25	25
Water Content	l	6.6	8.4	10.3	12.0
Weight Dry/Wet	kg	115/121.6	120/128.4	145/155.3	150/162.0
Electrical Supply	Voltage / Phases / Hz	220-240/1/50	220-240/1/50	220-240/1/50	220-240/1/50
Power Consumption Max (inc. internal pump)	W	240	321	363	418
Design Water Flow Rate @ Δt20°C	l/s	0.71	0.93	1.10	1.31
Efficiency @ Full Load Gross/Net	%	87.8/97.5	87.5/97.2	87.5/97.2	87.5/97.2
Efficiency @ 30 % of Full Load Gross/Net	%	97.3/108.0	96.9/107.6	96.9/107.6	96.9/107.6
Boiler seasonal efficiency ²	%	96.4	96.6	96.6	96.8
Flue Classification		B23, C13, C33, C43, C53, C63, C83			
Optional Accessory Items					
Weight of Low Loss Header	kg	9.1	9.1	9.1	9.1
Resistance of Boiler with Inbuilt Low Loss Header	kPa	5.3	9.0	13.0	18.0
Weight of Boiler Protection Plate Heat Exchanger	kg	14.5	14.5	14.5	16.4
Resistance of Secondary Side of Plate Heat Exchanger	kPa	9.5	15.9	21.8	18.6
Maximum Pressure - Secondary Side of Plate Heat Exchanger	bar	6.0	6.0	6.0	6.0

¹ Energy efficiency class  (space heating): Product/System according to Directive 2010/30/EU and Regulation (EU) 811/2013

² Calculated using the formula given in equation 2 in the Non-Domestic Building Service Compliance Guide

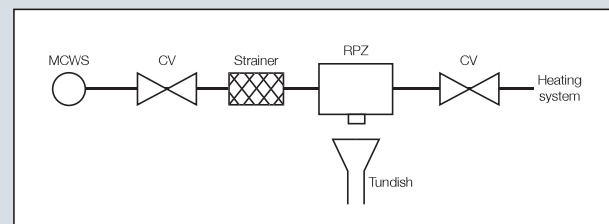
Filling the system

The Initial filling of a sealed heating system, and subsequent refilling, must be by a method that has been approved by the Water Regulation Advisory Scheme (WRAS) for the type of heating system, i.e. Domestic (in-house) Fluid Category 3 (C-3). Non Domestic (other than in-house) Fluid Category 4 (C-4).

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.



System water

Trigon L series boilers must only be installed onto sealed and pressurised systems with a minimum static pressure of 1bar. All systems must be thoroughly cleansed prior to the connection of the boiler and the system water must be dosed with a good quality treatment to prevent corrosion within the system and the formation of scale within the boiler waterways. The chloride content of the fill water must not exceed 200mg/l. Particular care must be taken when installing the boiler onto an old system, with consideration given to the installation of a dirt arrester/filter or the use of the plate heat exchanger option.

For specialist advice and water treatment products, contact: Fernox, Tandem House, Marlowe way, Beddington Farm Road, Croydon CR0 4XS. Tel: 0208 665 6666 or Betz Dearborn Ltd, Widnes, Cheshire WA8 8UD. Tel: 0151 495 186

Flue system

The Trigon L Boilers have been tested using 110/150 Concentric Flue and as a result of the examination, the appliances may be used with up to 15m of Concentric Flue Pipe plus 4 x 93 degree bends plus a Concentric Terminal.

If planning to install a non room sealed flue; the following data will be of assistance:

Boiler Model Trigon		L 65	L 85	L 100	L 120
Max Resistance of Flue	Pa	230	230	230	230
1m Length 110mm Ø PP Flue Gas Tube	Pa	1.25	2.25	3.0	4.0
110mm Ø 93° PP Bend	Pa	1.25	2.25	3.0	4.0
110mm Ø 45° PP Bend	Pa	1.0	1.8	2.4	3.2
110mm Ø Open Termination with Bird Mesh Guard	Pa	1.25	2.25	3.0	4.0

Electrical connection

There are two terminal rails located in the upper right hand area of the boiler under a removable cover plate.

Low Voltage Terminal Rail

Terminal No's

- 50-51 = QAA 73 modulating room unit (optional extra)
- 52-53 = Volt free contact room thermostat (alternative to QAA 73)
- 54-55 = Factory fitted inlet gas pressure switch. Do not tamper.
- 56-57 = No function
- 58-59 = HWS sensor (QAZ 36) or thermostat
- 60-61 = Outside air temperature sensor (QAC34/101) Supplied as standard with boiler

Mains Voltage Terminal Rail

Terminal

- L1 = Supply Phase 220 - 240V 10A
- N = Supply Neutral
- E = Earth
- E = Earth
- E = Earth
- E = Earth
- 1-2 = External Safety Interlock (Remove link to connect a volt free external interlock device)
- 3 (L) - 4(N) = DHW Primary Pump (max 1Amp)
- 6(N) - 7 (L) = Factory Fitted Internal Boiler Pump.
Do Not Tamper
- 8(N) - 9(L) = Heating Circuit Pump (max 1Amp)

Optional additional control items

A number of optional extra control items are available to enhance the control and or monitoring of the Trigon L Boiler.

BMS volt free contact alarm interface - Clip-in Module"AGU2.5" (optional extra) will provide volt free contacts to monitor "run" and "fault alarm" status. In addition the AGU2.5 Module allows analogue control input (0-10Vdc & 0-20 m Amp) to be connected to a single boiler.

QAA 73 Remote Room Unit, allows time and temperature scheduling of a (weather compensated if required) heating circuit and a hot water circuit, with room influence and optimization if required (For use with a single boiler only).

AGU 2.500 Clip-In Module. Allows a 2nd heating circuit, with or without a mixing valve to be connected to a single boiler.

RVA 63.280 A controller which provides time and temperature scheduling over two heating circuits (weather compensated if required) (with or without mixing valves) and a hot water circuit. Can be used with a single boiler in addition to the basic function of the boiler and in addition to the connection of an AGU 2.500, i.e. allowing control of up three or four heating circuits. Can also be used in conjunction with a multiple boiler installation by connection to a RVA47 Cascade Manager.

RVA 47 A Cascade Manager with capability to control up to 12 boilers plus a heating circuit (weather compensated if required) and a hot water circuit. Note an OCI 420 Clip-in Module is required in each boiler of a multiple boiler installation for bus communication purposes.

QAA 70 Remote Room Unit with similar features to the QAA73 Unit described above, but for use in conjunction with an RVA 47 or RVA 63.280 controllers.

QAA50 Room sensor with temperature adjustment, can be used as an alternative to the QAA 70 described above.

QAA10 Room sensor which can be used as an alternative to the QAA 70 unit described above. Provides tamper-proof room temperature sensing.

QAZ36 Hot Water Temperature Sensor for use with a standard boiler or QAZ21 for use with the RVA47 and RVA63.280 Controllers.

For specific details on controls applications see the boiler installation manual or contact ELCO UK.

Hydraulic schemes

Typical single
Trigon L
(standard
version) boiler
schematic

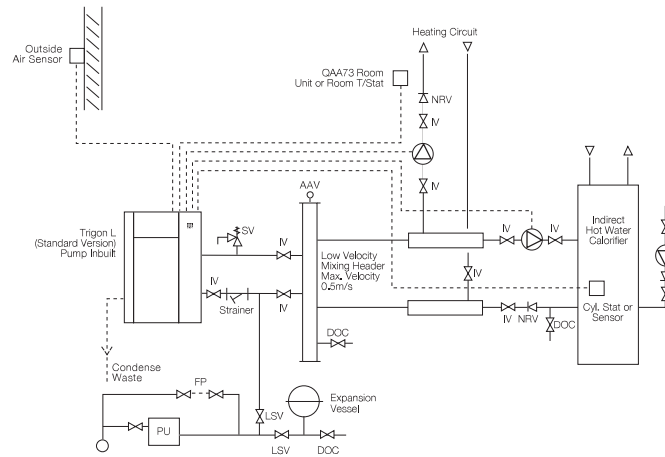
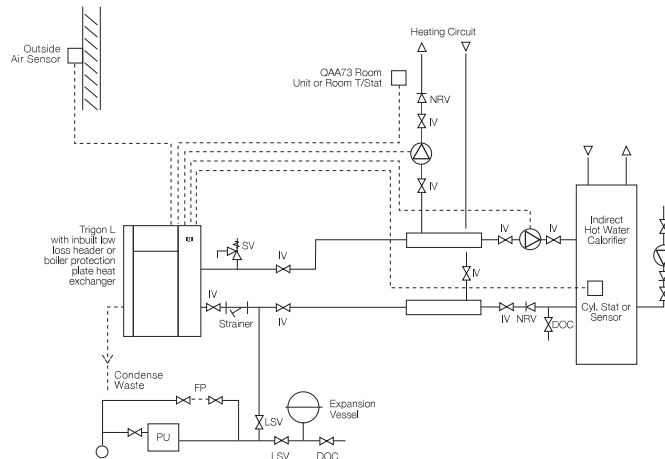


Fig.1

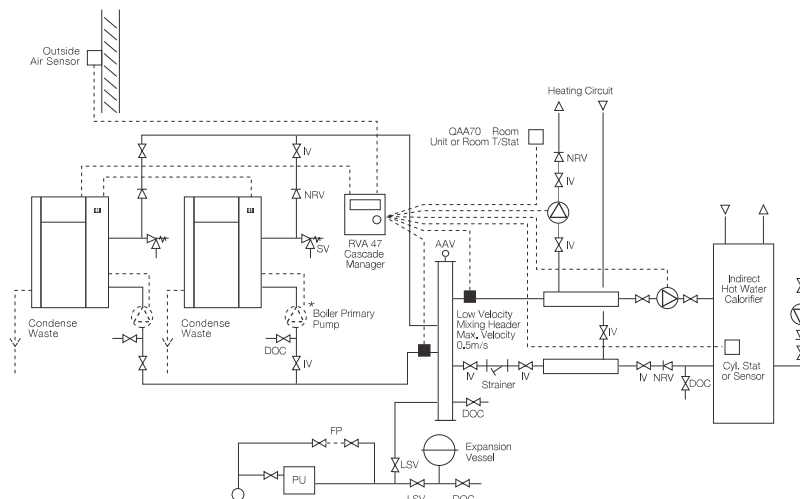
Typical scheme
for single Trigon
L boiler with
inbuilt optional
low loss header
or boiler
protection plate
heat exchanger



Note: Boilers equipped with optional boiler protection plate heat exchanger must be provided with (temporary) provision for filling to fill point located within boiler casing

Fig.2

Typical multiple
Trigon L installation
schematic. If using
RVA47 Cascade
Manager + OCI420
Communication
Clips within boilers
from MHS - up to
12 boilers may be
controlled



Note: Boilers equipped with optional boiler protection plate heat exchanger must be provided with (temporary) provision for filling to fill point located within boiler casing

* Boiler primary pump - only required when boilers are equipped with boiler protection plate heat exchangers

Fig.3



ELCO UK
3 Juniper West
Fenton Way
Southfields Business Park
Basildon
Essex SS15 6SJ
Tel: 01268 546700
Fax: 01268 888250
www.elco.co.uk



January 2014

MAXXflo

High Efficiency Condensing Stainless Steel Storage Water Heaters

Brochure and Specification Sheet



Working towards
a cleaner future



MAXXflo

High Efficiency Condensing Stainless Steel Storage Water Heaters

The MAXXflo range of condensing stainless steel water heaters from Andrews Water Heaters offer a revolutionary concept in self contained, storage water heating for commercial applications. Featuring stainless steel tanks, these high efficiency units incorporate a fully modulating burner function to provide maximum performance combined with economic running costs. Heat input and water flow are carefully regulated to produce a closely controlled water temperature and our design principle affords protection against Legionella bacteria. Virtually instantaneous hot water is available since the heat exchanger is sited externally to the storage tanks.

Condensing Stainless Steel Storage Water Heaters

The MAXXflo range of stainless steel condensing storage water heaters provide numerous solutions for both commercial and industrial applications. The range consists of nine models with tank options of 200 or 300 litres capacity and a choice of four outputs from 30 to 120kW.

The small footprint and multiple flue options provide greater flexibility when siting the unit.

The high efficiency heat exchanger, modulating burners and tank design allow the heater to generate hot water in the condensing mode up to 80% of the tank volume producing an efficiency of 109%.

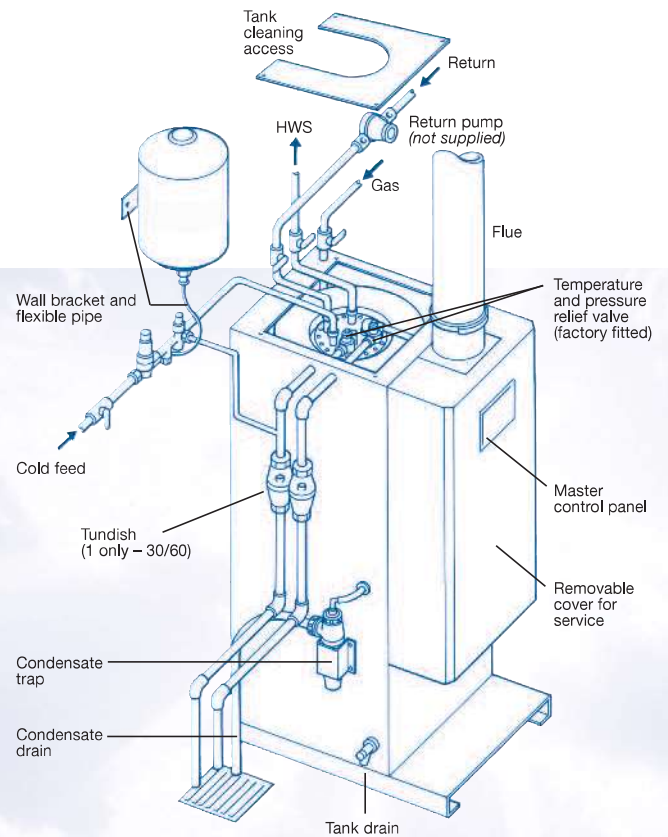
The water heaters can be installed as room-sealed balanced flue appliances using concentric flue components supplied by Andrews Water Heaters. Alternatively conventional flue components can be used (suitable for condensing appliances) giving a longer flue run.

A digital electronic master controller operates the pre-mix fully modulating gas burners fitted to each of the heater modules. The tank temperature, up to 70°C, is set on the master control. Building Energy Management System (BEMS) and other external interfaces are provided.

Standard MAXXflo Features

- Integral 200 or 300 litre stainless steel tank
- Condensing, 109% net efficiency
- Pre-mix modulating gas burner(s)
- Single bottom drain
- Large clean out opening in tank top
- Variable speed pump(s)
- Room sealed or conventional flue
- State of the art electronics with diagnostics
- Built-in high temperature anti-Legionella programme
- The secondary pump can be powered via the heater
- BEMS interface.
- Additional 200 and 300 litre stainless steel storage tanks available
- Energy Technology Listed (ECA)
- WRAS approved

Typical Installation

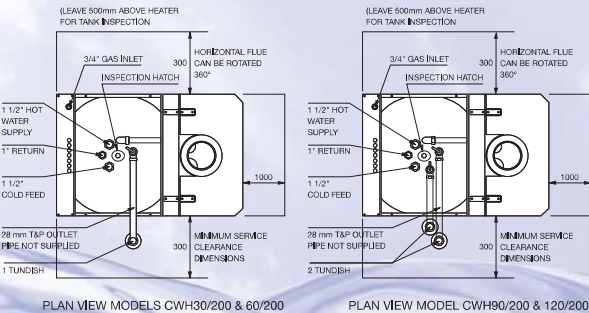
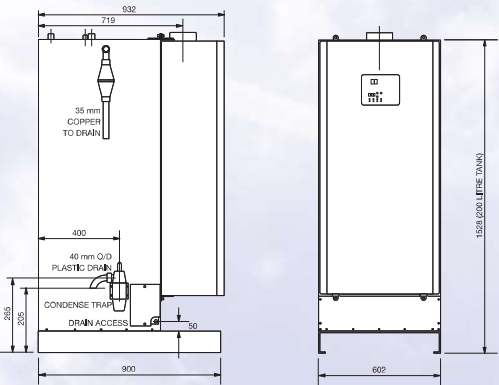


An unvented mains feed kit (28mm dia) can be supplied with all MAXXflo models. The kit comprises a combined strainer/pressure reducing valve set to 3.5 bar, check valve assembly, expansion valve set to 6.0 bar, 25 litre expansion vessel and tundish. The combined temperature/pressure relief valve(s) is factory fitted.

The water heater tank temperature can be set between 40°C and 70°C by using the + or - buttons on the master controller.

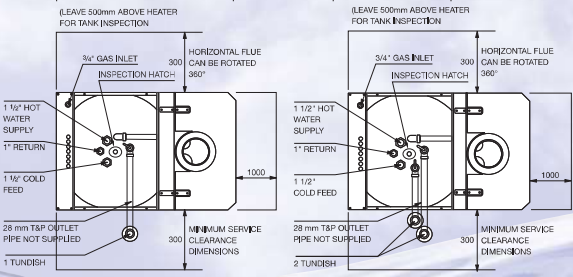
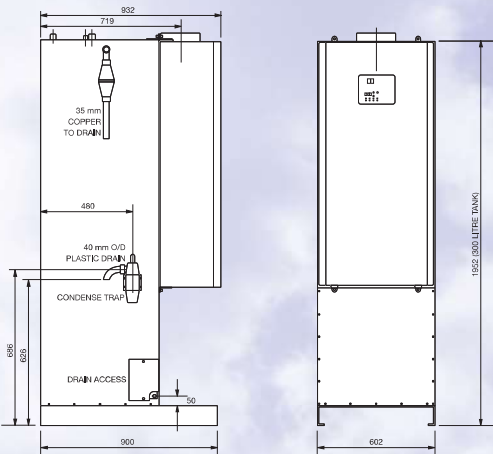
Dimensions:

MAXXflo CWH30/200, CWH60/200,
CWH90/200 & CWH120/200



Dimensions:

MAXXflo CWH30/300, CWH60/300,
CWH90/300 & CWH120/300

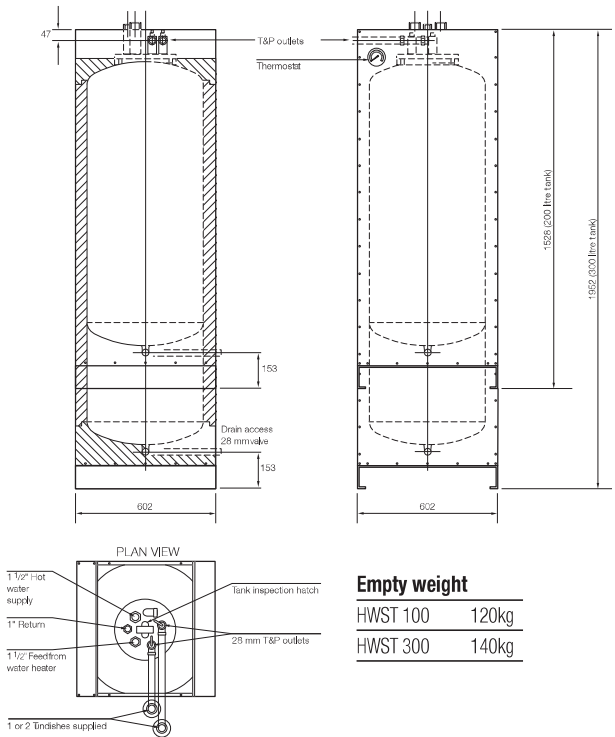


PLAN VIEW MODEL CWH30/300 & 60/300

PLAN VIEW MODEL CWH90/300 & 120/300

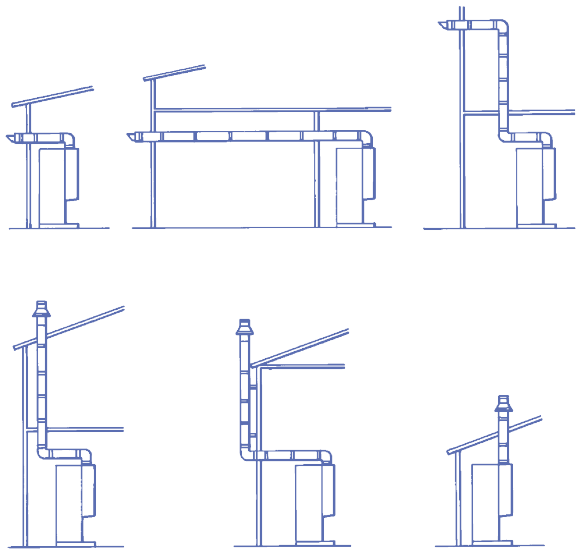
HWST Tank Dimensions

HWST 200 HWST 300 STORAGE TANKS



Flue Systems

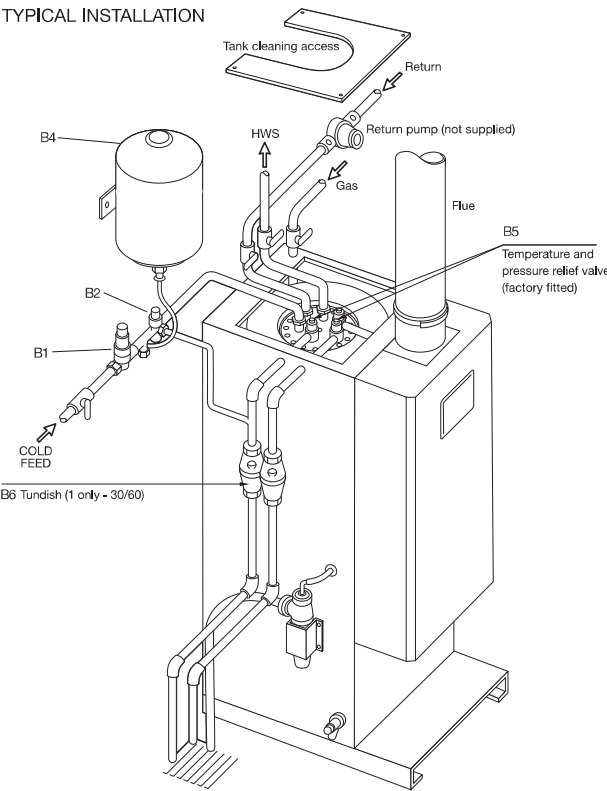
Heaters can be used with concentric flue to provide a room sealed application. Refer to installation manual and price list for approved flues from Andrews. Alternatively if a conventional flue system is used the flue must be suitable for condensing appliances. Please contact our sales department for further details.



Unvented Systems Kit installation details

MAXXflo water heater CWH30/60/90/120

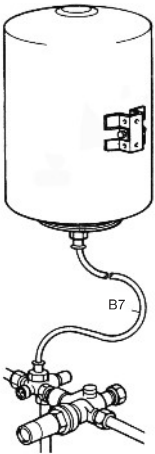
TYPICAL INSTALLATION



Complete Unvented Systems Kit Part no. B328 - MAXXflo

Description	Andrews Part No	Size
B1 Combined Reducing Valve/Strainer	C784	1" BSP
B2 Check Valve and Manifold	C785	1" BSP
B3 Expansion Valve	C786	3/4" BSP
B4 Expansion Vessel (25 Litre) c/w Wall Bracket	C782	3/4" BSP
B5 Temperature/Pressure Relief Valve (factory fitted)	C380 (1 or 2)	1" BSP
B6 Tundish from Expansion Valve & T/P Valve (supplied with heater)	C384 (1 or 2)	1 1/4" BSP
B7 Hose Assembly	C788	

NB: Tees, elbows, stop valve and pipework not supplied



Specification

Model Reference CWH		30/200	60/200	90/200	120/200
		30/300	60/300	90/300	120/300
Input gross Hs min/max	kW	6.7–31.1	13.4–62.2	20.1–93.3	26.8–124.4
Input nett Hi min/max	kW	6.0–28.0	12.0–56.0	18.0–84.0	24.0–112.0
Output (tank set point = 60°C) min/max	kW	6.5–30.5	13.0–61.0	19.5–91.6	26.0–122.1
Natural Gas, G20					
Gas Consumption	m³/h	2.96	5.93	8.89	11.85
Minimum Dynamic Gas Supply Pressure	mbar	20	20	20	20
Propane, G31					
Gas Consumption	kg/h	2.18	4.35	6.53	8.71
Minimum Dynamic Gas Supply Pressure	mbar	37	37	37	37
Efficiency (gross)	%	98	98	98	98
Efficiency (nett)	%	109	109	109	109
Standby Heat Loss	Mj per month	780	780	780	780
Condense Rate	l/hr	3	6	9	12
Condense Trap Size	mm	40	40	40	40
NO _x level @ 0% O ₂	ppm	25	25	25	25
NO _x level @ 0% O ₂	mg/kWh	44	44	44	44
Noise level	dBA	51	51	51	51
Ionisation current – max	µA	6.0	6.0	6.0	6.0
Ionisation current – min	µA	4.0	4.0	4.0	4.0
HSI resistance	kΩ	1.0 – 1.4	1.0 – 1.4	1.0 – 1.4	1.0 – 1.4
Max recovery thru 50°C	ltrs/h	480	960	1440	1920
Max recovery thru 56°C	ltrs/h	429	856	1284	1712
Flue size (concentric) Internal/External	mm	80/125	80/125	130/200	130/200
Flue Size (conventional)	mm	80	80	130	130
Max flue run – concentric	m	14	12	14	14
Max flue run – conventional	m	50	20	50	40
Max flue static pressure	Pa	140	140	140	140
Inlet/Outlet connections	BSP	1½"	1½"	1½"	1½"
Return connection	BSP	1"	1"	1"	1"
Nominal operating water pressure	bar	3.5	3.5	3.5	3.5
Maximum water pressure	bar	6.0	6.0	6.0	6.0
Minimum water pressure	bar	1.0	1.0	1.0	1.0
Gas connection (gas cock supplied)	BSP	¾"	¾"	¾"	¾"
Electrical supply	V/Hz	230/50	230/50	230/50	230/50
Power consumption	W	170	340	510	680
Depth	mm	900	900	900	900
Width	mm	602	602	602	602
Height (200 litre)	mm	1528	1528	1528	1528
Height (300 litre)	mm	1952	1952	1952	1952
Weight – empty (200 litre)	kg	155	170	185	200
Weight – empty (300 litre)	kg	165	180	195	210
Weight – full (200 litre)	kg	355	370	385	400
Weight – full (300 litre)	kg	465	480	495	513
Shipping weight (200 litre)	kg	178	193	208	213
Shipping weight (300 litre)	kg	188	203	218	233
Shipping depth	mm	1040	1040	1040	1040
Shipping width	mm	880	880	880	880
Shipping height (200 litre)	mm	1653	1653	1653	1653
Shipping height (300 litre)	mm	2077	2077	2077	2077

* Noise level measured at 2m from flue terminal

** Reduce flue length by 1.2m for 90° bend, 0.7m for 45° bend and 1.5m for condensate trap

*** Reduce flue length by 4m for 90° bend, 2m for 45° bend and 4m for condensate trap



Panel display



Top view of heater

The MAXXflo range features stainless steel tanks with external heat exchanger(s) and fully automatic electronic control with BEMS interface as standard.

The heaters must be installed with a minimum water pressure of 1 bar. It is recommended that the MAXXflo water heater is installed in conjunction with a suitable base exchange type water conditioner in areas of hard water.

The heaters are factory fitted with temperature and pressure relief valve(s). A gas cock, water draw-off cock and comprehensive instruction manual are also included. The water heaters can be fitted with concentric flue for room sealed applications; horizontal or vertical flue kits must be ordered separately – see manual.

Conventional flue, suitable for condensing applications can be used if the plantroom is ventilated.



RS 33961



WRAS
APPROVED
PRODUCT



0087

PART OF BDR THERMEA

Baxi Commercial
Wood Lane, Erdington,
Birmingham B24 9QP

Sales:

Technical:

0845 070 1056 0845 070 1057



Email: andrews@baxicommercialdivision.com
www.andrewswaterheaters.co.uk



REMEHA R-GEN 5.0 SENERTEC DACHS

TECHNICAL SPECIFICATION SHEET

This is a quick reference specification sheet, full details can be found at remeha.co.uk

May 2017

PERFORMANCE	
Fuel	Natural Gas
Load	100%
Electrical output ⁽¹⁾ (kW)	5
Electrical efficiencies (H _i / H _e)	26% / 23%
Thermal output ⁽²⁾ (kW)	14.6
Thermal efficiencies (H _i / H _e)	74% / 67%
Total efficiencies (el.+Th.) (H _i / H _e)	100% / 90%
Power Performance coefficient	0.34
Fuel input ⁽³⁾ (kW)	19.6
Gas volume flow (m ³ /h)	1.87
Seasonal space heating energy efficiency	156%
Annual energy consumption (kWh / GJ)	7487 / 27
Operation	On/off condensing
ENGINE	
Type/stroke	Lean burn gasoline engine / 4
Number of cylinders	1
Speed (RPM)	2450
Service intervals (Running hours)	3500
ELECTRICAL	
Voltage (V)	400
Frequency (Hz)	50
Own use Auxiliary demand (kW)	0.09
Generator type	Asynchronous
Grid application type	G83/2
Grid system type	TN-S
Circuit breaker	C
NOISE	
Sound pressure (1m) (max./min.) dB(A)	54
Sound power level L _{WA} indoors (dB)	69
DIMENSIONS AND WEIGHT	
Unit	Module without controller
Width (mm)	720
Depth (mm)	1070
Height (mm)	1200
Weight (kg)	530

SERVICE SPACE	
Side (mm)	600
Front (mm)	600
Rear (mm)	350
EFFICIENCY CLASS	
ErP ⁽⁴⁾	A+++
CONNECTIONS	
Exhaust (DN in mm)	80
Flow (Inches)	1"
Return (Inches)	1"
Gas (Inches)	1/2"
Condensate (Inches)	1/2"
PRESSURES	
System Working Pressure min. (bar)	1
System Working Pressure max. (bar)	3
CHP Safety Valve Fitted (bar)	3
Gas pressure min. (mbar)	15
Gas pressure max. (mbar)	24
EMISSIONS	
BREEAM NO _x Emission (mg/kWh)	1
Grid NO _x Emission (mg/kWh)	617
Electrical (mg/kWh)	839
Thermal (mg/kWh)	76
COMBUSTION AIR	
Mass flow (kg/h)	37
Volume flow (m ³ /h)	On application
FLUE GAS	
Waste gas mass wet (kg/h)	40.8
Waste gas mass dry (kg/h)	On application
Waste gas volume wet (m ³ /h)	33
Waste gas volume dry (m ³ /h)	27

(1) According to DIN ISO 3046, measured at the generator terminals. Values may differ depending on altitude, environmental conditions and conditions of use.

(2) Values from type/component test report for a return temperature of 30°C with integrated condensing unit; maximum supply flow temperature 83°C, maximum return flow temperature 70°C.

(3) Values from type/component test report for a return flow temperature of 60°C according to H_i, tolerance ±5%.

(4) Calculation according to EN 50465:2015 with Remeha packages with temperature controller. Information correct on the date of publishing.