

BAGMA Refrigerant Handling & Air Conditioning Diagnostic Training for the Agricultural Industry



BAGMA Mobile Air Conditioning Modular Training Programme

The modular training programme is **City & Guilds** and **Institute of the Motor Industry** accredited.



City & Guilds



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Introduction to Markets and Opportunities

Overview of the market

The number of agricultural businesses working directly on vehicle Air Conditioning (A/C) systems is growing rapidly. Wider trends towards increased reliability (at vehicle, system and component level) and longer service intervals have meant A/C service and repair has received substantial attention as a rare aftermarket growth area. A/C has become almost standard-fit and it requires service & maintenance, offering forward-thinking dealers a profit opportunity.

It is now, no longer just the franchised dealers that are involved. Each passing year sees more and more companies moving into A/C and the job of selling the service and preventative maintenance is being made easier by the vehicle manufacturers (VMs). More than 50% of VMs now either have A/C-related scheduled maintenance or run promotions via their dealer networks to generate business and build awareness.

Opportunities for A/C Service / Repair include:

Refrigerant loss = Servicing Opportunity = Profit

Systems lose refrigerant naturally at around 10-15% per annum causing a range of secondary problems including:

Poor cooling - Most noticeable in hot weather.

Impaired lubrication - Can eventually cause compressor failure.

Air in system - Can cause excessive pressure and speed up internal system corrosion.

Moisture in system - Can cause blockage and contribute to corrosion.

Servicing A/C systems regularly will not only improve performance and fuel economy it will also minimise the risk of damage and problems.

Odour problems = anti-bacterial treatment opportunity

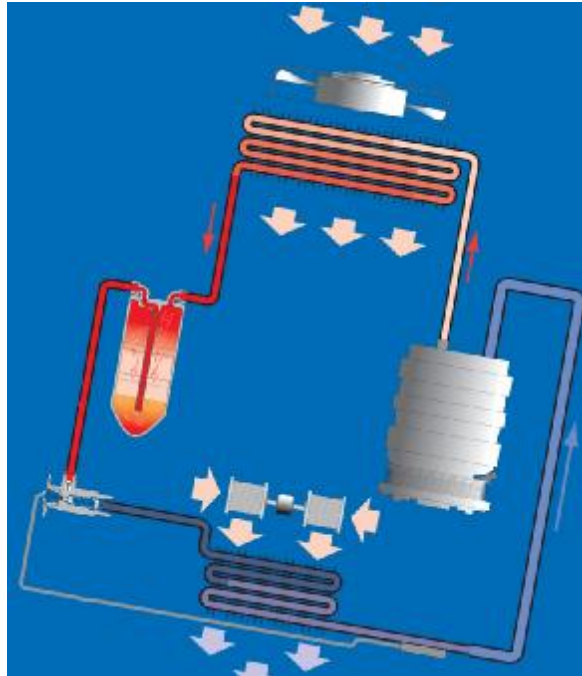
Stale or unpleasant smells are a common and unfortunate side-effect of A/C. These smells and even "sick car syndrome" (where vehicle occupants experience flu-like symptoms) are the result of bacteria build-up in the evaporator. This problem can be easily treated.

General system repairs

Unfortunately, as preventative maintenance has not always been standard practice many A/C systems have suffered years of neglect. The result is often component or system failure. The positioning of the condenser at the front of the vehicle also makes it vulnerable to salt corrosion, stone damage, etc.

Existing industry technicians seeking to increase skills

In addition to national vocational training opportunities there are significant numbers of technicians looking to develop new skills or enhance existing ones. As A/C is relatively new to the mass market the majority of technicians outside of luxury-marque servicing and the franchised dealer networks are likely to have had very limited experience of working on A/C components and systems. Where businesses enter the market to profit from the service and repair opportunity there is an urgent need for skilled labour. The training requirement is heightened by the perception that A/C is a highly specialist and technically challenging area.



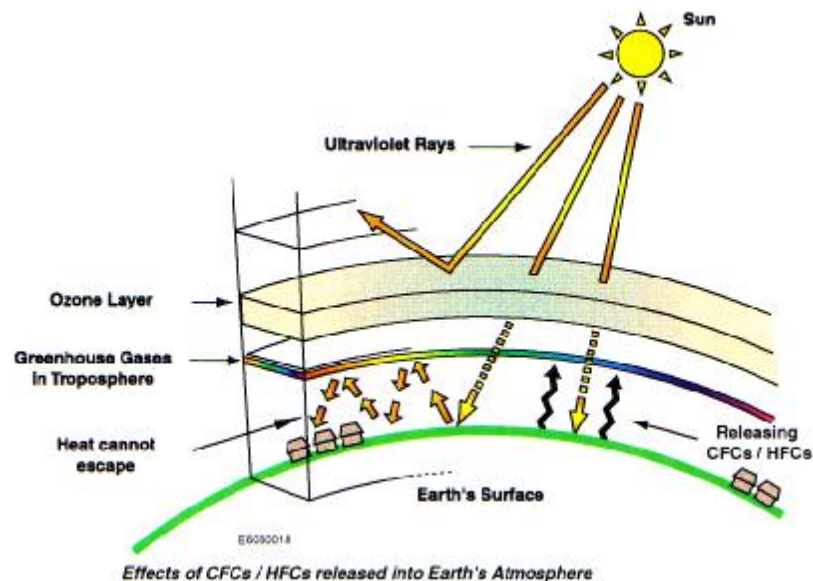
There is a clear commercial incentive; to build profits in this area; you need to know how to do the work. BAGMA offers City & Guilds or Institute of the Motor Industry (IMI) mobile air conditioning qualifications that are mapped around BAGMA Training Modules, offering three different levels of certification for the technicians. This means BAGMA can deliver these qualifications quickly and easily and the award of a City & Guilds or IMI qualification offers the extra credibility of an established training brand.



Refrigerant handlers seeking legislative compliance

The use of refrigerants in commercial applications has been the subject to on-going environmental concerns, leading to scrutiny at a global level. R12 refrigerant has been banned on vehicle production since 1995 and in the aftermarket since 2000, under European Regulation 2037 which targeted ozone-depleting CFCs. R134a has since been the standard automotive refrigerant.



However, the new European **F-Gas Regulation**, designed to limit emissions of greenhouse gases, is set to once again shake up the UK Agricultural & Automotive A/C market. It is specifically targeting HFC refrigerants (inc. R134a) as their high Global Warming Potential (GWP) meaning they are potent contributors to the greenhouse effect. The new Regulation imposes a mandatory refrigerant registration scheme on all member states and includes a requirement to define and enforce a minimum qualification for all **refrigerant handlers**.



This means all technicians recovering or charging refrigerant to agricultural & automotive systems will need to be qualified to a set minimum level. This is expected to reach our statute books sometime in 2006. Once the standard is in the public domain a rush to comply is anticipated. BAGMA and Autoclimate have been closely involved, both with City & Guilds and Institute of the Motor Industry as part of the agricultural / automotive working group established by DEFRA to look at the industry training and qualification requirement and associated implementation issues.

Objectives

BAGMA's Objectives:

-  To develop and support a national network of specialist agricultural and automotive dealers to offer high quality A/C services to agricultural and automotive customers.
-  To establish BAGMA's learning and support materials as the "industry standard" platform for delivering City & Guilds or Institute of the Motor Industry Progression Award in Mobile Air Conditioning systems, Refrigerant Handling, Servicing and Repair, Diagnostics.
-  To offer a low cost "off the shelf" solution for dealerships wishing to offer high quality A/C service.

Training Programme Structure

BAGMA's Technical Training Programme is delivered in seven modules. The modules cover self-contained subject areas and build up in a logical and systematic way.

The modules have been designed to be flexible enabling BAGMA to deliver training on territory; minimising disruption to businesses and additional costs for external training.

Module Numbers	Name
1	A/C Fundamentals & Refrigerant Handling
1a	Refrigerant Handling
2	Air Conditioning Components
3	Auto Electrics
4	Basic A/C Diagnostics
5	Climate Control Systems
6	Advanced A/C Diagnostics

Training Programmes

Module	Name	Duration
1	A/C Fundamentals & Refrigerant Handling	2 days
1a	A/C Refrigerant Handling (<i>Assessment Only</i>)	1.5 hours
1a	A/C Refrigerant Handling & Assessment	1 day
2, 3 & 4	A/C Basic Diagnostics	3 days
5 & 6	Advanced A/C Diagnostics	2 days
	Specialist Customers Designed Training	D.O.A.

Training Programme Accreditation

External Qualification	Awarding Body	Modules Required
IMI. 610 Level 2 Air Conditioning	IMI.	Module 1
Certificate in Mobile Air Conditioning systems	City & Guilds	
Part 1 Refrigerant Handling		Modules 1 / 1a
Part 2 Basic Mobile Air Conditioning Principles		Modules 1 / 1a
Part 3 Advance Diagnostics Mobile Air Conditioning systems / climate control		Modules 2 to 6

Occupational Route for "Air Conditioning and Climate Control" was included in the City & Guilds 4100 Level 3 Progression Award in Automotive Vehicle Servicing and Repair. Progression Awards have been designed by City & Guilds to support government initiatives towards the National Qualifications Framework; BAGMA's module syllabus 1-6 meets the underpinning knowledge requirement for candidates for the City & Guilds Certificate in Mobile Air Conditioning, which also meets requirement for the related N/SVQ without requiring or providing the full N/SVQ evidence of occupational competence.

A/C Fundamentals & Refrigerant Handling Assessment

**Duration 2 days
Module 1**

Aims:

To give attendees the technical and practical knowledge required to ensure competence whilst handling refrigerant on Mobile Air Conditioning systems (MAC).

This course is designed to cover safe recovery & refilling of MAC systems.

Who Should Attend:

The course is designed for technicians, with no experience of MAC systems. It is also suitable for apprentices who have had at least one year's experience within the agricultural or automotive dealer / distributor centre and needs to be trained on MAC fundamentals.

Course Content:

- ❄ Functions of air conditioning, basic processes, pressures, refrigeration cycle and systems.
- ❄ Configurations, refrigerant state & condition.
- ❄ Lubrication, flushing, electrical system, refrigerants, alternative refrigerants, ozone layer & the greenhouse effect.
- ❄ Regulations & legislation, service equipment and service procedures, including practical assessment.

Course Structure:

The course has both practical and theoretical sessions; the practical work will be carried out on a MAC system; either a tractor or car depending on customer requirements.

Course Certification:

The performance of each student is monitored throughout the course, with a 1.5 hour practical / multi choice theory assessment on the last day. Providing the student reaches the required standard; a certificate will be awarded for either:

- ❄ City & Guilds Certificate in Mobile Air Conditioning Systems:
Part 1 Refrigerant Handling & Part 2 Basic Mobile Air Conditioning Principles
- ❄ Institute of the Motor Industry, IMI 610 Certificate in Mobile Air Conditioning.

A/C Refrigerant Handling Assessment

Duration 1.5 Hr

Aims:

To assess attendees technical and practical knowledge required to ensure competence whilst handling refrigerant on Mobile Air Conditioning systems (MAC).

This assessment is designed to cover safe recovery & refilling of MAC systems.

Who Should Attend:

The assessment is designed for the technician, who has attended manufacturers A/C training course and has gained a minimum of 12 months experience on MAC systems in the agricultural or automotive dealer / distributor centre environment.

❄ Assessment Content:

- ❄ Refrigerant Handling, recovery, evacuation, recharge and leak check R134a system.
- ❄ Functions of air conditioning, basic processes, pressures, refrigeration cycle and systems.
- ❄ Configurations, refrigerant state & condition.
- ❄ Lubrication, flushing, electrical system, refrigerants, alternative refrigerants, ozone layer & the greenhouse effect.
- ❄ Regulations & legislation, service equipment and service procedures, including practical assessment.

Assessment Structure:

The assessment has both practical and theoretical parts; the practical work will be carried out on a MAC system; either a tractor or car depending on customer requirements.

Course Certification:

The performance of each student is monitored through out the assessment, with a 1.5 hour practical / multi choice theory assessment. Providing the student reaches the required standard; a certificate will be awarded for MAC Refrigerant Handling, working towards either:

- ❄ City & Guilds Certificate in Mobile Air Conditioning Systems:
Part 1 Refrigerant Handling & Part 2 Basic Mobile Air Conditioning Principles
- ❄ Institute of the Motor Industry, IMI 610 Certificate in Mobile Air Conditioning.

A/C Refrigerant Handling & Assessment

**Duration 1Day
Module 1a**

Aims:

To give attendees the technical updates required to ensure competence whilst handling refrigerant on Mobile Air Conditioning systems (MAC).

This course is designed to cover safe recovery & refilling of MAC systems.

Who Should Attend:

The assessment is designed for the technician, who has attended a manufacturers A/C training course and has gained a minimum of 12 months experience on MAC systems in the agricultural or automotive dealer / distributor centre environment.

Assessment Content:

Overview & update:

- ❄ Refrigerant Handling, recovery, evacuation, recharge and leak check R134a system.
- ❄ Refrigerants, alternative refrigerants, ozone layer & the greenhouse effect.
- ❄ Regulations & legislation, service equipment and safe recovery procedures,

Assessment Structure:

The assessment has both practical and theoretical parts; the practical work will be carried out on a MAC system; either a tractor or car depending on customer requirements.

Course Certification:

The performance of each student is monitored throughout the course, with a 1.5 hour practical / multi choice theory assessment on the day. Providing the student reaches the required standard; a certificate will be awarded for MAC Refrigerant Handling, working towards either:

- ❄ City & Guilds Certificate in Mobile Air Conditioning Systems:
Part 1 Refrigerant Handling & Part 2 Basic Mobile Air Conditioning Principles
- ❄ Institute of the Motor Industry, IMI 610 Certificate in Mobile Air Conditioning.

A/C Basic Diagnostics

Duration 3 days
Modules 2, 3 & 4

Aims:

To give attendees the technical and practical knowledge to enable them to carry out basic fault diagnose and repair of Mobile Air Conditioning systems (MAC).

This course is designed to cover diagnostics by gauge pressure interoperation, diagnostics and repair procedures for both T.X.V / F.O.T (Thermal Expansion Valve / Fixed Orifice Tube) systems.

Who Should Attend:

The course is designed for experienced technicians who have completed Refrigerant Handling and who have had at least one year's experience within the agricultural or automotive dealer / distributor centre environment.

Course Content:

- ❄️ Diagnostics by gauge pressure interpretation system diagnostics and repair procedures for both T.X.V / F.O.T systems.
- ❄️ A/C electrical components (including purpose, operation, test & fault diagnosis), electrical fault finding & wiring diagrams.
- ❄️ In-depth operation, purpose, construction of A/C components.
- ❄️ Diagnostic equipment and correct diagnostic procedures, practical basic fault finding A/C system including recommended repair procedures.

Course Structure:

The course has both practical and theoretical sessions and assessments; the practical work will be carried out on a MAC system; either a tractor or car depending on customer requirements.

Course Certification:

The performance of each student is monitored throughout the course, with a 1.5 hour practical / multi choice theory assessment on the last day. Providing the student reaches the required standard; a certificate credit will be awarded, working towards either:

- ❄️ City & Guilds Certificate in Mobile Air Conditioning Systems:
Part 3 Advance Diagnostics Mobile Air Conditioning systems / climate control

A/C Advanced Diagnostics

**Duration 2 days
Modules 5 & 6**

Aims:

To give attendees the technical and practical knowledge to enable them to fault diagnose and repair Mobile Air Conditioning systems (MAC).

This course is designed to cover in detail of A/C components, electrics, climate control systems and advance diagnostics for MAC systems.

Who Should Attend:

The course is designed for experienced technicians who have completed Refrigerant Handling for MAC systems, and who have had at least one year's experience within the agricultural or automotive dealer / distributor centre environment.

Course Content:

- ❄ Climate control configurations, functions, operations, components (including purpose, construction, and operation), fault diagnosis of climate control components /operations, dual zone systems, twin evaporator systems & wiring configurations.
- ❄ Diagnostic equipment and correct diagnostic procedures, practical fault finding A/C system including recommended repair procedures.

Course Structure:

The course has both practical and theoretical sessions and assessments; the practical work will be carried out on a MAC system; either a tractor or car depending on customer requirements.

Course Certification:

The performance of each student is monitored through out the course, with two 1.5 hour practical / multi choice theory assessment on the last day. Providing the student reaches the required standard; a certificate will be awarded for either:

- ❄ City & Guilds Certificate in Mobile Air Conditioning Systems:
Part 3 Advance Diagnostics Mobile Air Conditioning systems / climate control

Costs - 2007

Modules	Name	Duration	Cost per Candidate (BAGMA Member)*	Cost per Candidate (Non Member)*
1	A/C Fundamentals & Refrigerant Handling	2 days	£340	£400
1a	A/C Refrigerant Handling (<i>Assessment Only</i>)	1.5 hours	£P.O.A	£P.O.A
1a	A/C Refrigerant Handling & Assessment	1 day	£170	£200
2, 3 & 4	A/C Basic Diagnostics	3 days	£510	£600
5 & 6	Advanced A/C Diagnostics	2 days	£340	£400
	Specialist Customers Designed Training	D.O.A	P.O.A	P.O.A

Modules include course materials, registration & certification for:

❄ City & Guilds Certificate in Mobile Air Conditioning Systems: (Parts 1, 2 or 3).

Registration and certification can be obtained in addition to that of City & Guilds for £85 per person:

❄ Institute of the Motor Industry, IMI 610 Certificate in Mobile Air Conditioning.

* Costs are based on 6 candidates attending each training course.

All costs exclude VAT; correct at time of issue, BAGMA reserves the right to amend costs.

Enquiries and Bookings:

BAGMA, Entrance B, Level 1, Salamander Quay West, Park Lane, Harefield, Middlesex, UB9 6NZ.

Tel: 0870 205 2834, Fax: 0870 205 2835, E-mail: nikkietherton@bagma.com