

# Global trends in Mobile A/C

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# 2001 global light vehicle sales/Mill.

• W-Europe	16,5
• N-America	19,6
• Asia /Pac.	12,5
• S-America	2,5
• C-E-Europe	2,5
• M-East	1,3
• Africa	0,8
• TOTAL	55,7

• Source: Automotive News Europe

# Estimated Production global a/c units 2001 & 2006/ Mill.

• W-Europe	12 (75%)	15
• N-America	15-16 (98%)	17-18
• Asia /Pac.	14 (88%)	16-17
• C-E-Europe	< 1	1-2
• Africa + M.E.	< 1	< 1
• S-America	1 (41%)	1-2
• TOTAL	43 (77%)	52

# 2001 Global A/C Fleet/Mill.

• W-Europe	60-65
• N-America	220-240
• Africa	2-3
• M-East	5-6
• Asia /Pac.	100-110
• S-America	4-6
• C-E-Europe	3-4
• TOTAL	390-430

# Estimated 2001 global a/c fleet; leakage = 72 gr\*/unit/annum

- W-Europe 4,5 Million kilo
- N-America 16,6 „
- Africa 0,2
- M-East 0,4
- Asia /Pac. 7,5
- S-America 0,4
- C-E-Europe 0,3
- TOTAL 30 Million kilo Refr.
- \* 72 gr: DG Environment

# Refrigerants in use around the world

- R-134a
- R-12
- Blends
- Hydrocarbons
- Others (R-22)

# R-12

- Frequent use aftermarket NA(USA), AFr, AS, SA
- Substantial stock
- Substantial black market
- Cheaper than R-134a
- R-134a units often rebuilt to R-12 in 3. World countries
- “Better Cooling performance than R-134a”
- R-134a humidity service aspects
- Trend: will remain popular for time being in 3. world



# Blends & Hydrocarbons

- U.S.A.; 8-12 types on the market; statistically importance insignificant
- Europe; 3-4 types on the market; importance statistically insignificant
- Other continents; situation comparable
- Compatibility, Identification and Contamination problems can occur
- Trend: will remain insignificant and slowly die in Europe/US with disappearance R-12 cars
- Hydrocarbons: 3. World/ not significant/ flammability issues

# Aspects Multiple refrigerants

- Identification issues
- Contamination issues
- Compatibility issues
- Cost issues
- Educational issues
- Safety issues

# OEM trends; main drivers

- Environment
- Fuel consumption
- Comfort
- Europe: Increasing heating problems DI-Diesel and DI-Gasoline cars
- Costs
- Safety issues

# Environment ; *continuous..*

- Variable and Externally controlled compressors
- Higher performance , more compact heat exchangers
- Integrated filter dryers
- Introduction New fitting/ sealing technologies
- Introduction New refrigerant hose
- Less refrigerant charge
- Parking ventilation systems (solar)
- System & component integration

# Environment/ future

- Electrically driven compressor
- Alternative refrigerant development projects
- Insulation techniques
- Solar reflective glass
- One thermal system (heat/cool/ventilate)
- Refrigerant leak sensors
- Dual-loop systems

# Comfort

- In cabin air quality ( sensors, electronic systems)
- Multi-zone units
- Parking ventilation
- Parking a/c systems
- Ergonomic control panels
- Externally controlled compressor
- Heated/Cooled Seats
- Sophisticated air distribution ( e.g. Permeative Dashboard)

# Fuel consumption

- Integration components and modules
- Use light-weight materials
- Capacity-Controlled compressors
- More compact heat exchangers + compressors
- More efficient heat exchangers
- More advanced control systems
- *Note*: no more opened windows with a/c

# Safety aspects of auto a/c

- Auto a/c units enhance driving visibility (clear windows)
- Use auto a/c units enhances concentration level driver and alertness
- Use auto a/c units enhances visual capacities
- A warm interior leads to fatigue
- High/ low blood pressure patients: excessive high temperatures can lead to cardiac problems



# Aftermarket trends

- Growing a/c penetration means more a/c service centers
- Car manufacturers extensify dealer networks
- Number of suppliers and distributors grows on global basis
- Availability new equipment to speed up work in workshop
- Service work increasingly complicated
- Lack of professional training centers on global basis

# Aftermarket Trends II/ the consumer

- Also in future workshop money must be made in 4-5 months highseason
- After three years lifetime more than 50% of vehicles go to free service centers
- Consumer reluctant to pay for very expensive repairs and looks for cheaper repair options
- Instant satisfaction: customer not willing to wait long
- Demand for low cost parts

# Service landscape members

- Official vehicle dealers; good equipment- good information- basic to sufficient technical knowledge (decreasing quantity of dealers)
- Professional free specialists; good basic equipment- lack of original information-excellent technical knowledge+ experience
- Less professional free service centers; basic equipment- lack of information- insufficient knowledge- price dumping!!
- Many interrelations between members

# Diagnostic/ Service Work becoming more and more complicated I

- Multiple refrigerants mean more equipment and knowledge (service, leak detection, diagnostic tools etc).
- Higher variety in vehicles
- Components difficult to find
- Less refrigerant means lower charge tolerance
- No universal equipment yet to read error codes
- Access to vehicle-info still difficult/ expensive



# Result

- More Symptomatic repairs!!
- Consequence: unit will fail again sooner or later w/wo refrigerant loss
- Consequence:Topping-off with refrigerant
- Consequence:Customer will start shopping; specialist loses track of the unit

# Training landscape

- Not enough training centres
- Few advanced training courses
- Few follow-up courses
- Few Modules “Electronics”
- Training courses often focusing on complying with legislation
- Supplier Training courses often focusing on handling the equipment

### 3. World Countries

- Training very basic, if at all
- If legislation; hardly enforcement
- Diagnostics often on basis of intuition + rumour: many returns
- R134a vehicle often re-charged with R12
- Original units often rebuilt to simplify service or lack/ price of original parts
- Refrigerant recovery seldom

# Some suggestions to enhance workshop quality

- Stimulate, subsidize setup of more training centres
- Auto A/C Training to include Electronics Course
- Auto Mechanic Courses should include A/C as option
- Legislation should be basic ( example: STEK system Holland)
- Foundation of Auto A/C Quality Institute + Industry Certification Program Auto A/C Specialists incl. incentives by industry
- Standardisation of parts