

The Need to Establish SAE Documents for Alternate Refrigerants

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The Mobile A/C Industry Status



- A mature industry in developed countries
- Developing countries lack technical training/support
- Replacement refrigerants for HFC-134a
 - Require:
 - System design standards
 - New service equipment
 - Technician training
 - **Effect on Environment**

U. S. System Service Profile

	<u>1994</u>	<u>1998</u>
Million Lt. Veh.	186	206
<u>Component</u>		
A/C Compr	1.23%	1.78%
A/C Condsr	N/A	.99%
AC Htr/Blwr	1.25%	1.03%
A/C Rechd	11.06%	8.84%

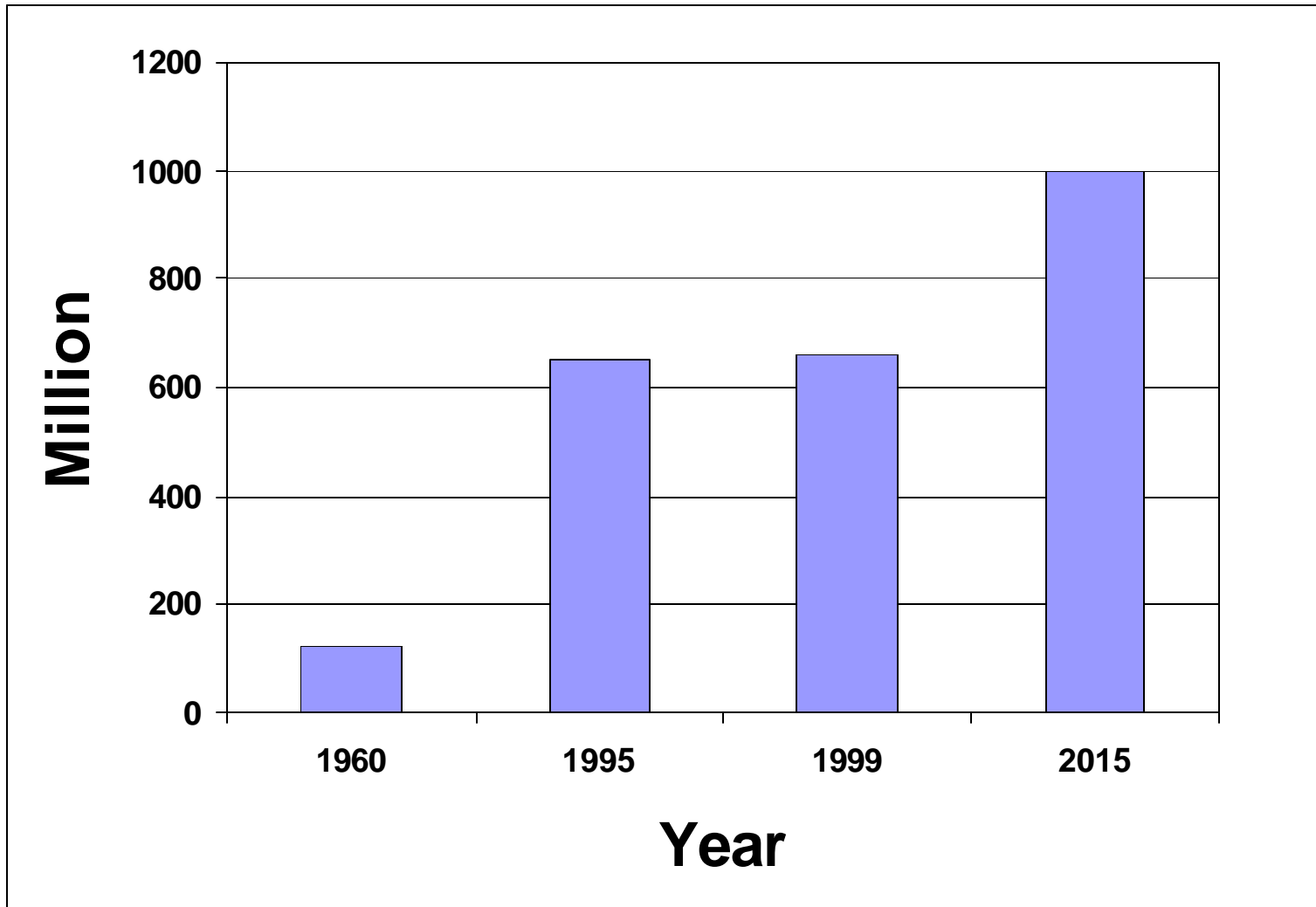
— % of a/c fleet

U.S. Vehicle Life Profile

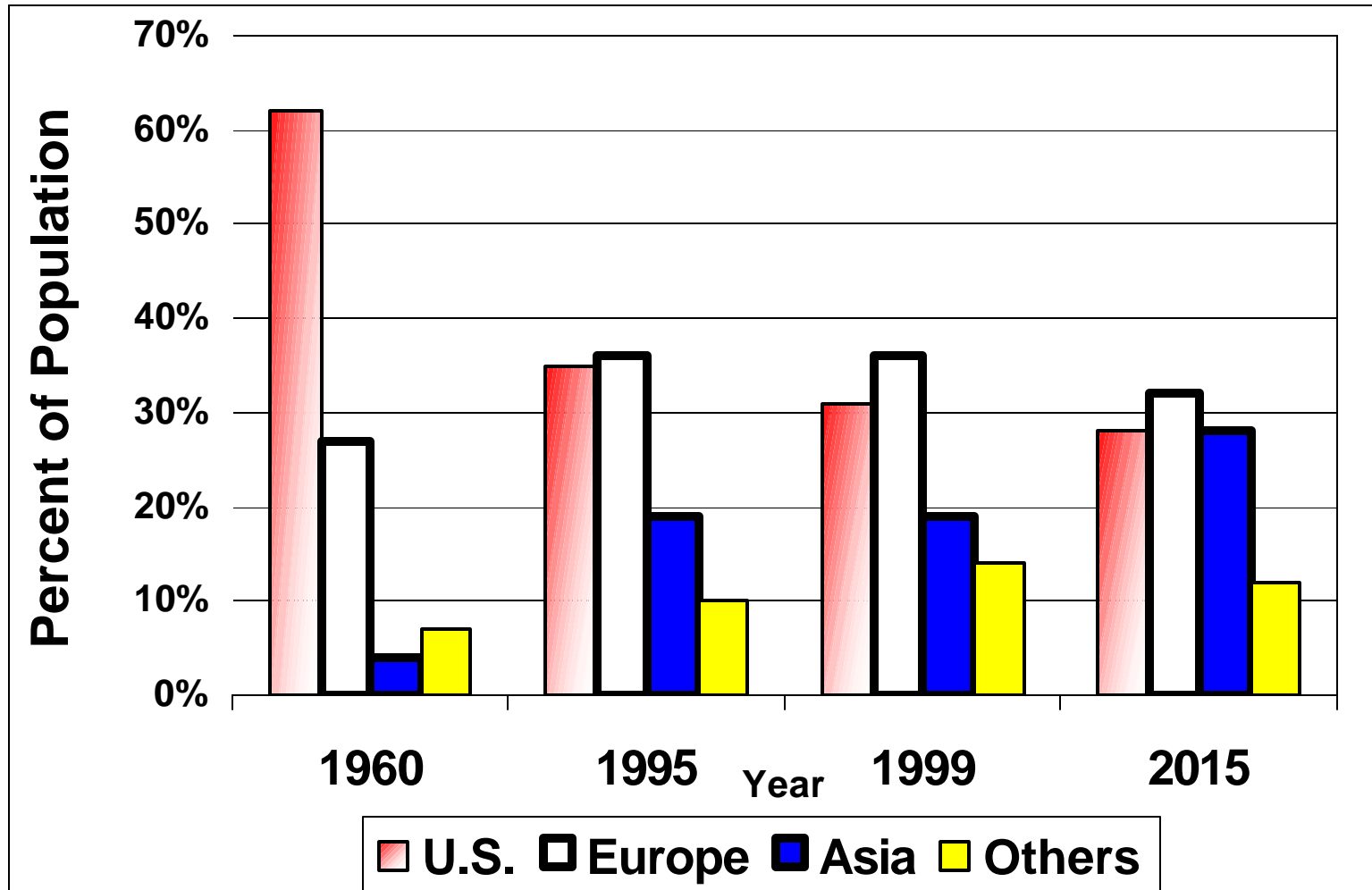


- 49% of the passenger cars are over 8 years old
- 48% of trucks are over 8 years old.
- Expect 47% to be 10 years old by 2002
- Expect useful life to reach 15 years

World Vehicle Population



Vehicle Regional Population



A/C System Design



- Based Upon World Vehicle Population Growth
 - Increased percentage of small vehicles
 - Potential for different A/C systems due to:
 - | Availability of refrigerants
 - | Local environmental requirements
 - | Consumer response to vehicle:
 - A/C performance
 - drivability/fuel economy

SAE Documents



- Must address Mobile Air- conditioning:
 - System Design Guidelines
 - | Safety
 - | Common fittings & connections
 - System Performance
 - Service Equipment
 - Technician Training

SAE System Design Guidelines



- Service Fittings - J639
- Hose Coupling - J2064
- Establish couplings/fittings for:
(Current systems not standardized)
 - Heat exchangers
 - Compressors
 - System refrigerant controls

SAE System Performance



- Expected level of A/C system performance
 - J1659
 - Panel outlet temperatures
 - System pressures
 - Evaporator freeze protection
 - System refrigerant change

SAE Service Equipment



- Service gauges - J2196 - J2197
- Leak detection equipment/procedures
J1627 - J1628 - J2298 - J2299
- Refrigerant charge equipment
(currently no standards)
- Refrigerant recovery/recycle equipment
J1990 - J2210

SAE Technician Training



- Basic service training
- Diagnostic procedures
- Existing SAE Documents J1989 - J2211

Conclusion



- Worldwide environmental conditions may require other refrigerants
- Environmental impact for alternate refrigerants must consider:
 - Total system energy requirements
 - Expected environmental and consumer benefits
- To provide international serviceability
 - **Design Guidelines Documents are required for industry standardization**

Conclusion



- Design Guidelines Must Include:
 - Safety Concerns for:
 - Total A/C system design - & Service Equipment
 - Occupants -- Service Technicians
- Current Concerns
 - **No Alternate Refrigerant System Draft Standards Exist**

Conclusion



- **Without**
 - **The Existence of SAE/ISO Industry Standards**
 - **Adequate Testing**
- **This Industry is Currently Not Ready to Replace HFC-134a Mobile A/C Systems with an Alternate Refrigerant System**