



RESIDENTIAL AIR CONDITIONING

● SOCIETAL IMPORTANCE

Residential air conditioning is essential in today's society. The increase in global population has produced an expansion into hotter climates as the need for living space increases. Without air conditioning, this growth would not be possible. Air conditioning provides comfortable, clean living, and it is critical in ensuring safe living conditions. In addition, persons with respiratory ailments are now able to endure the hottest days of summer due to the availability of residential air conditioning.

Critical Application Considerations

Air-conditioned homes, which were a luxury 30 years ago are now commonplace in North America. The air conditioning systems vary in type from central systems that provide climate control for an entire home to window units that are designed to cool only one or two rooms. Additionally, ductless split systems are growing in use as an alternative to ducted systems. Meanwhile in Asia and Australia the surge in home air conditioning has been even more robust. With increases in urbanization, consumer purchasing power and more widespread and stable power distribution both continents are witnessing growth rates of 7-8% annually. It is imperative that the HVAC industry continues to provide society with the

most appropriate solutions for maintaining comfortable and clean environments while also responding to changing environmental pressure. Also, cost and size considerations must be taken into account.

Home air conditioning is necessary for many people. For those with allergies and breathing issues, air conditioning has become essential in order to live a comfortable and productive life. Twenty years ago, those with allergies would have to endure the high pollen counts in the spring and late summer. Today they are able to escape those conditions with the use of air conditioning.

Environmental Considerations

Historically, our industry relied mainly on HCFCs; however, the last decade or more has witnessed a transition from ozone-depleting substances (such as HCFC-22) to non-ozone-depleting compounds such as HFC-410A. Many HFCs have relatively high GWPs and are now also under regulatory pressure to be replaced with lower GWP options. **However, the GWP of a refrigerant cannot be the only measure utilized when developing more environmentally responsible solutions.** Efficiency of the resulting system can be the

dominant factor affecting total global climate change impact. **Therefore the Life Cycle Climate Performance (LCCP) of a refrigerant must be calculated in order to have a true assessment of a refrigerant's climatic effect.**

In addition to working fluid concerns, technician training on responsible refrigerant handling practices is needed. Also, many options are made available for recovering used refrigerant in the field and returning it for reclamation and/or destruction.

Technology Trends

Today's homeowners have several options for air conditioning their homes. Each solution has its own benefits and advantages. Also, new system designs go beyond alternative air handling systems. Over the past 30 years, manufacturers have increased energy efficiency by over 50% through enhanced system and new technologies such as heat pumps which utilize the earth as a heat sink.

Predominantly the refrigerant used in central ducted air conditioning and ductless split systems has been HCFC-22. Currently, this is being replaced by the non-ozone-depleting HFC-410a, a blend of HFC-32 and HFC-125. Due to its higher operating pressures, HFC-410a requires new equipment designs that can operate at these higher pressures. Additionally, in a retrofit this solution requires all new equipment and line sets.

Window units have been available for over 50 years. The primary use of these units is for cooling one or two rooms in a house. Their benefits include affordability and easy installation. Additionally, the cost of operation is relatively low. Traditionally, these units were charged with HCFC-22. However, this equipment was redesigned to use HFC-410a, which was commercialized in the early 2000s.



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The Alliance is an industry coalition that was organized in 1980 to address the issue of stratospheric ozone depletion. It is presently composed of about 100 manufacturers and businesses which rely on HCFCs and HFCs.

Today, the Alliance is a leading industry voice that coordinates industry participation in the development of international and U.S. government policies regarding ozone protection and climate change.