

HFO's and the AIM Act

The Montreal Protocol, finalized in 1987, and ratified by the US Senate in 1988, is a global agreement to protect the earth's ozone layer, by phasing out production and consumption of ozone-depleting substances such as chlorofluorocarbons (CFC's), a class of synthetic refrigerants.

The Kigali Amendment to the Montreal Protocol, finalized in 2016, and ratified by the US Senate in 2022, is a global agreement intended to reduce the potential for global warming, by phasing out the production and consumption of hydrochlorofluorocarbons (HFC's), a class of synthetic refrigerants.

The American Innovation and Manufacturing Act (the AIM Act) empowered the EPA to mandate the phasedown of production and consumption of hydrochlorofluorocarbons (HFC's), "which are highly potent greenhouse gases" (1), the same class of synthetic refrigerants regulated by the Kigali Amendment.

From the Final Rule of the EPA's "Phasedown of Hydrofluorocarbons...", "The Act lists 18 saturated HFCs...that are covered by the statute's provisions, referred to as "regulated Substances" under the Act."

"There are hundreds of other possible HFC compounds. The 18 HFCs listed as regulated substances by the AIM Act are some of the most commonly used HFCs and have high impacts as measured by the quantity emitted multiplied by their respective GWPs (*global warming potentials*). These 18 HFCs are all saturated, meaning they have only single bonds between their atoms and therefore have longer atmospheric lives."

As the AIM Act seeks to phasedown these long-lived, highly potent greenhouse gases, synthetic refrigerant producers have introduced another class of refrigerants, hydrofluoroolefins (HFOs). These HFOs are unregulated by the AIM Act. But, in many applications, HFOs do not have the desired refrigerant characteristics and require compounding with highly potent greenhouse gases, HFCs, to be effective. These compounds have been referred to as HFO blends, though they are HFC/HFO blends.

In example, both R448A and R449A, HFC/HFO blends intended to replace HFCs 404A and 507A have greater percentages of AIM Act regulated HFCs than of HFOs. They both contain greater than 24% of the HFC-125 (GWP 3500), greater than 24% of the HFC-32 (GWP 677), and greater than 21% of the HFC-134a (GWP 1200) along with some HFO constituents.

Natural refrigerant solutions, such as ammonia, carbon dioxide and hydrocarbons, exist in nature, have no blended elements that are regulated by the AIM act, and offer users refrigeration systems that are environmentally friendly and sustainable.

(1) Quoted reference is Federal Register Vol. 86, No. 190, ENVIRONMENTAL PROTECTION AGENCY, 40 CFR Parts 9 and 84, Phasedown of Hydrofluorocarbons: Establishing the Allowance Allocation and Trading Program Under the American Innovation and Manufacturing Act