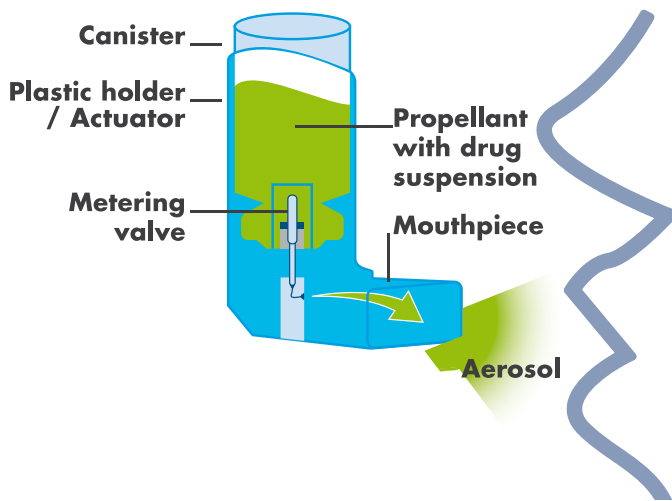


HFCs MAKE MDIs WORK



HFCs propellant

requires boiling point between -30°C and -10°C ensuring good atomisation to a very fine mist inhaled deeply into the lungs providing good delivery of the correct dose of medicine.

WHY USE HFCs



Liquefied gas

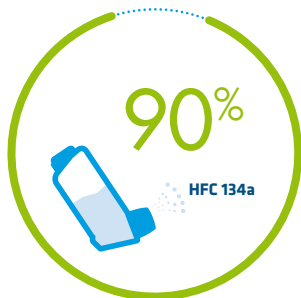


Safe for human use



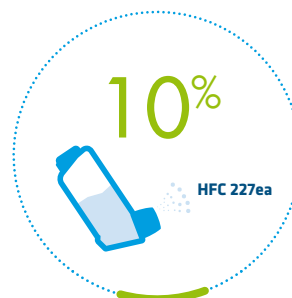
Stable formulations

HFCs USED IN MDIs



HFC 134a

it accounts for about **90%** of HFC used globally in MDIs



HFC 227ea

is used in the other **10%**

ENVIRONMENTAL EFFECT: HFCs ARE GREENHOUSE GASES but

Based on carbon footprint estimates, the estimated carbon dioxide equivalent of a **2-puff dose of an HFC MDI** (200g - 300g $\text{CO}_2\text{eq.}$) is comparable to the climate impact of everyday items, such as a 330ml can of cola (170g $\text{CO}_2\text{eq.}$)

GOING FURTHER TO REDUCE ENVIRONMENTAL EFFECT.... NEW LOW GWP PROPELLANTS

HFC-152a & HFO-1234ze(E) are being developed- Similar physical properties, lower GWPs

	HFC-134A	HFC-227EA	HFC-152A	HFO-1234ZE(E)
Boiling Point	-26.4°C	-16.4°C	-24.7°C	-19°C
GWP (F-Gas value)	1430	3220	124	<1 (AR5 value)

European pharmaceutical company announced HFC-152a MDI, planned introduction by end of 2025

HFC-152a or HFO-1234ze(E) would reduce carbon footprint by about 90% or more - similar to a dry powder inhaler (DPI)

RESPIRATORY DEVICES AND TREATMENT METHODS	CARBON FOOTPRINT PER DOSE (GRAMS CO ₂ -EQ)
HFC-134a MDI	200-300
HFC-227ea MDI	600-800
Dry Powder Inhaler	<20
Tablets	<20
HFC-152a or HFO-1234ze(E)	About 20

HFC-134a and HFC-227ea will continue to be used for a considerable time, not least due to the timescale for any transition to lower GWP propellants.