Global Warming Potentials (GWP) of selected compounds and their mixtures based on the Fourth (AR4) and Fifth (AR5) IPCC Assessment Reports and Regulation (EU) 2024/573 (F-gas Regulation) related to a period of 100 years

Table 1: Global Warming Potentials (GWP_{100}) of hydrofluorocarbons, hydrochlorofluorocarbons, and perfluorocarbons (HFCs, HCFCs and PFCs), as well as other perfluorinated compounds

Industrial nomenclature	Chemical nomenclature	Formula / Composition	GWP AR4 [1]	GWP AR5 [3]	GWP F-gas R. [5]
Hydrofluorocarbons and hydrochlorofluorocarbons (HFCs and HCFCs)					
HFC-23	Trifluoromethane	CHF_3	14 800	12 400	14 800
HFC-32	Difluoromethane	CH_2F_2	675	677	675
HFC-41	Fluoromethane	CH_3F	92	116	92
HFC-125	1,1,1,2,2-Pentafluoroethane	CF_3-CHF_2	3 500	3 170	3 500
HFC-134	1,1,2,2-Tetrafluoroethane	CHF_2-CHF_2	1 100	1 120	1 100
HFC-134a	1,1,1,2-Tetrafluoroethane	CF_3-CH_2F	1 430	1 300	1 430
HFC-143	1,1,2-Trifluoroethane	CHF_2-CH_2F	353	328	353
HFC-143a	1,1,1-Trifluoroethane	CF_3-CH_3	4 470	4 800	4 470
HFC-152	1,2-Difluoroethane	CH_2F-CH_2F	53	16	53
HFC-152a	1,1-Difluoroethane	CHF_2-CH_3	124	138	124
HFC-161	Fluoroethane	CH_2F-CH_3	12	4	12
HFC-227ea	1,1,1,2,3,3,3-Heptafluoropropane	CF_3-CHF-CF_3	3 220	3 350	3 220
HFC-236cb	1,1,1,2,2,3-Hexafluoropropane	CF_3-CF_2-CH_2F	1 340	1 210	1 340
HFC-236ea	1,1,1,2,3,3-Hexafluoropropane	CF_3-CHF-CHF_2	1 370	1 330	1 370

Industrial nomenclature	Chemical nomenclature	Formula / Composition	GWP AR4 [1]	GWP AR5 [3]	GWP F-gas R. [5]
HFC-236fa	1,1,1,3,3,3-Hexafluoropropane	CF_3-CH_2-CF_3	9 810	8 060	9 810
HFC-245ca	1,1,2,2,3-Pentafluoropropane	CHF_2-CF_2-CH_2F	693	716	693
HFC-245fa	1,1,1,3,3-Pentafluoropropane	CF_3-CH_2-CHF_2	1 030	858	1 030
HFC-365mfc	1,1,1,3,3-Pentafluorobutane	CF_3-CH_2-CF_2-CH_3	794	804	794
HFC-43-10mee	1,1,1,2,2,3,4,5,5,5-Decafluoropentane	CF_3-CF_2-CHF-CHF-CF_3	1 640	1 650	1 640
HCC-1130 (E)	trans-1,2-Dichloroethene	CHCl=CHCl		1	
HFC-1132 (E)	trans-1,2-Difluoroethene	CHF=CHF		1	>1
HFC-1132a	1,1-Difluoroethene	CH_2=CF_2		1	0.052
HCFC-1224yd (Z)	cis-1-Chloro-2,3,3,3-Tetrafluoroprop-1-ene	CHCl=CF-CF_3 (Z)		1	0.06
HFCKW-1233xf	2-Chloro-3,3,3-Trifluoroprop-1-ene	CH_2=CCl-CF_3			1
HCFC-1233zd (E)	trans-1-Chloro-3,3,3-Trifluoroprop-1-ene	CHCl=CH-CF_3 (E)	4.5 [2]	1	3.88
HFC-1234yf	2,3,3,3-Tetrafluoroprop-1-ene	CH_2=CF-CF_3	4 [2]	1	0.501
HFC-1234ze (E)	trans-1,3,3,3-Tetrafluoroprop-1-ene	CHF=CH-CF_3 (E)	7 [2]	1	1.37
HFC-1336mzz (E)	trans-1,1,1,4,4,4-Hexafluorobut-2-ene	CF_3-CH=CH-CF_3 (E)			17.9
HFC-1336mzz (Z)	cis-1,1,1,4,4,4-Hexafluorobut-2-ene	CF_3-CH=CH-CF_3 (Z)	9 [2]	2	2.08
	1,1,1,2,3,4,5,5,5-Nonafluoro-4-trifluoromethyl-pent-2-ene	CF_3-CF=CF-CF$(CF_3)_2$			1
Perfluorocarbons (PFC)					
PFC-14	Tetrafluoromethane (Perfluoromethane)	CF_4	7 390	6 630	7 380
PFC-116	Hexafluoroethane (Perfluoroethane)	C_2F_6	12 200	11 100	12 400
PFC-c-216	Hexaafluorocyclopropane (Perfluorocyclopropane)	c-C_3F_6	17 340	9 200	9 200
PFC-218	Oktafluoropropane (Perfluoropropane)	C_3F_8	8 830	8 900	9 290
PFC-c-318	Octafluorocyclobutane (Perfluorocyclobutane)	c-C_4F_8	10 300	9 540	10 200

Industrial nomenclature	Chemical nomenclature	Formula / Composition	GWP AR4 [1]	GWP AR5 [3]	GWP F-gas R. [5]
PFC-3-1-10	Decafluorobutane (Perfluorobutane)	C_4F_{10}	8 860	9 200	10 000
PFC-4-1-12	Dodecafluoropentane (Perfluoropentane)	C_5F_{12}	9 160	8 550	9 220
PFC-4-1-14	Perfluoro-2-methylpentane	CF_3-$CF(CF_3)$-CF_2-CF_2-CF_3 (i-C_6F_{14})			7 370
PFC-5-1-14	Tetradecafluorohexane (Perfluorohexane)	C_6F_{14}	9 300	7 910	8 620
PFC-9-1-18	Octadecafluorodecaline (Perfluorodecaline)	$C_{10}F_{18}$	7 500	7 190	7 480
Other perfluorinated compounds					
	Sulphur hexafluoride	SF_6	22 800	23 500	24 300
	Nitrogen trifluoride	NF_3	17 200	16 100	17 400
	Trifluoromethylsulphur-pentafluoride	SF_5CF_3	17 700	17 400	18 500
	Sulphuryl fluoride	SO_2F_2		4 090	4 630
R-13I1	Trifluoroiodomethane	CF_3I	0.4		
	Heptafluoroisobutyro-nitrile	$(CF_3)_2CF$-CN (i-C_3F_7CN)			2 750
	Perfluoro-N-methylmorpholine	$C_5F_{11}NO$			8 800
	Perfluorotripropylamine	$C_9F_{21}N$			9 030
	Perfluorotributylamine (PFTBA)	$C_{12}F_{27}N$			8 490

Table 2: Global Warming Potentials (GWP_{100}) of chlorofluoroethers (HCFE), fluorinated ethers (HFE), fluorinated alcohols and ketones and perfluoropolyethers (PFPE)

Industrial nomenclature	Chemical nomenclature	Formula / Composition	GWP AR4 [1]	GWP AR5 [3]	GWP F-gas R. [5]
Chlorofluoroethers and fluorinated ethers (HCFE und HFE)					
HFE-125		CHF_2-O-CF_3	14 900	12 400	14 300
HFE-134 (HG-00)		CHF_2-O-CHF_2	6 320	5 560	6 630
HFE-143a		CH_3-O-CF_3	756	523	616
HFE-227ea		CF_3-CHF-O-CF_3	1 540	6 450	7 520
HCFE-235ca2 (Enflurane)		CHF_2-O-CF_2-CHFCl		583	654
HCFE-235da2 (Isoflurane)		CHF_2-O-CHCl-CF_3	350	491	539
HFE-236ca12 (HG-10)		CHF_2-O-CF_2-O-CHF_2	2 800	5 350	6 060
HFE-236ea2 (Desflurane)		CHF_2-O-CHF-CF_3	989	1 790	2 590
HFE-236fa		CF_3-CH_2-O-CF_3	487	979	1 100
HFE-245cb2		CF_3-CF_2-O-CH_3	708	654	747
HFE-245fa1		CHF_2-CH_2-O-CF_3	286	828	934
HFE-245fa2		CHF_2-O-CH_2-CF_3	659	812	878
HFE-254cb1		CH_3-O-CF_2-CHF_2	359	301	328
HFE-263mf		CF_3-CH_2-O-CH_3	11	1	2.06
HFE-329mcc2		CF_3-CF_2-O-CF_2-CHF_2	919	3 070	3 770
HFE-338mcf2		CF_3-CH_2-O-CF_2-CF_3	552	929	1 040
HFE-338mmz1		$(CF_3)_2$CH-O-CHF_2	380	2 620	3 040
HFE-338pcc13 (HG-01)		CHF_2-O-CF_2-CF_2-O-CHF_2	1 500	2 910	3 320
HFE-347mcc3 (HFE-7000)		CH_3-O-CF_2-CF_2-CF_3	575	530	576
HFE-347mcf2		CHF_2-CH_2-O-CF_2-CF_3	374	854	963
HFE-347mmy1		$(CF_3)_2$CF-O-CH_3	343	363	392
HFE-347mmz1 (Sevoflurane)		CH_2F-O-$CH(CF_3)_2$		216	195
HFE-347pcf2		CHF_2-CF_2-O-CH_2-CF_3	580	889	980
HFE-356mec3		CH_3-O-CF_2-CHF-CF_3	101	387	264
HFE-356mm1		$(CF_3)_2$CH-O-CH_3	27	14	8.13

Industrial nomenclature	Chemical nomenclature	Formula / Composition	GWP AR4 [1]	GWP AR5 [3]	GWP F-gas R. [5]
HFE-356pcc3		CH_3-O-CF_2-CF_2-CHF_2	110	413	277
HFE-356pcf2		CHF_2-CH_2-O-CF_2-CHF_2	265	719	831
HFE-356pcf3		CHF_2-O-CH_2-CF_2-CHF_2	502	446	484
HFE-365mcf3		CF_3-CF_2-CH_2-O-CH_3	11	1	1.6
HFE-374pc2		CHF_2-CF_2-O-CH_2-CH_3	557	627	12.5
HFE-449s1 (HFE-7100)		C_4F_9-O-CH_3	297	421	460
HFE-569sf2 (HFE-7200)		C_4F_9-O-C_2H_5	59	57	60.7
HFE-43-10pccc124 (H-Galden 1040x)		CHF_2-O-CF_2-O-C_2F_4-O-CHF_2	1 870	2 820	3 220
n-HFE-7100		CF_3-CF_2-CF_2-CF_2-O-CH_3			544
i-HFE-7100		$(CF_3)_2$CF-CF_2-O-CH_3			437
i-HFE-7200		$(CF_3)_2$CF-CF_2-O-CH_2-CH_3			34.3
HFE-7300		n-$(CF_3)_2$CF-CF(O-CH_3)-C_2F_5			405
Fluorinated alcohols and ketones					
	2,2,3,3,3-Pentafluoropropan-1-ol	CF_3-CF_2-CH_2-OH	42	19	34.3
	Bis(trifluoromethyl)-methanol	$(CF_3)_2$CH-OH	195	182	206
	Octafluorotetramethylen-hydroxymethyl-group	-$(CF_2)_4$CH(OH)-	73	13	13.6
	1,1,1,3,4,4,4-Heptafluoro-3-(trifluoromethyl)butan-2-one	CF_3-C(O)-$CF(CF_3)_2$			0.29
	Perfluoro(2-methyl-3-pentanone)	CF_3-CF_2-C(O)-$CF(CF_3)_2$			0.114
Perfluoropolyether (PFPE)					
PFPMIE	Perfluoropolymethyliso-propylether	$CF_3(O-CF(CF_3)CF_2)_n$-(O-$CF_2)_m$-O-CF_3 (n,m=1)	10 300	9 710	10 300

Table 3: Global Warming Potentials (GWP_{100}) of halogen free substances

Industrial nomenclature	Chemical nomenclature	Formula / Composition	GWP AR4 [1]	GWP F-gas R. [5]
	Methane	CH_4	25	27.9
R-170	Ethane	CH_3-CH_3	5.5	0.437
R-290	Propane	CH_3-CH_2-CH_3	3.3	0.02
R-600	n-Butane	CH_3-CH_2-CH_2-CH_3	4	0.006
R-600a	i-Butane (Isobutane)	$(CH_3)_2$-CH-CH_3	3	0
R-601	n-Pentane	CH_3-CH_2-CH_2-CH_2-CH_3	5 [4]	0
R-601a	i-Pentane (Isopentane)	$(CH_3)_2$-CH-CH_2-CH_3	5 [4]	0
	Cyclopentan	C_5H_{10}		0
R-E170	Dimethylether (DME)	CH_3-O-CH_3	1	1
R-610	Diethylether	CH_3-CH_2-O-CH_2-CH_3	4	1
R-611	Methylformate	$HCOOCH_3$	25	11
R-702	Hydrogen	H_2	6	6
R-717	Ammonia	NH_3	0	0
R-718	Water	H_2O	0	0
R-723	Dimethylether/Ammonia - Blend	R-717 (NH_3): 60% R-E170 (CH_3-O-CH_3): 40%	1	1
R-744	Carbon dioxide	CO_2	1	1
R-1150	Ethene (Ethylene)	CH_2=CH_2	3.7	40
R-1270	Propene (Propylene)	CH_2=CH-CH_3	1.8	

Table 4: Global Warming Potentials (GWP_{100}) of HFC-mixtures / Refrigerant blends

Industrial nomenclature	Formula / Composition	GWP AR4 [1]	GWP AR5 [3]	GWP F-gas R. [5]
R-404A	HFC-125 (CHF_2-CF_3): 44% HFC-134a (CH_2F-CF_3): 4% HFC-143a (CH_3-CF_3): 52%	3 922	3 943	3 922
R-407A	HFC-32 (CH_2F_2): 20% HFC-125 (CHF_2-CF_3): 40% HFC-134a (CF_3-CH_2F):40%	2 107	1 923	2 107
R-407B	HFC-32 (CH_2F_2): 10% HFC-125 (CHF_2-CF_3): 70% HFC-134a (CF_3-CH_2F): 20%	2 804	2 547	2 804
R-407C	HFC-32 (CH_2F_2): 23% HFC-125 (CHF_2-CF_3): 25% HFC-134a (CH_2F-CF_3): 52%	1 774	1 624	1 774
R-407D	HFC-32 (CH_2F_2): 15% HFC-125 (CHF_2-CF_3): 15% HFC-134a (CF_3-CH_2F): 70%	1 627	1 487	1 627
R-407E	HFC-32 (CH_2F_2): 25% HFC-125 (CHF_2-CF_3): 15% HFC-134a (CF_3-CH_2F): 60%	1 552	1 425	1 552
R-407F	HFC-32 (CH_2F_2): 30% HFC-125 (CHF_2-CF_3): 30% HFC-134a (CF_3-CH_2F): 40%	1 825	1 674	1 825
R-407G	HFC-32 (CH_2F_2): 2.5% HFC-125 (CHF_2-CF_3): 2.5% HFC-134a (CF_3-CH_2F): 95%	1 463	1 331	1 463
R-407H	HFC-32 (CH_2F_2): 32.5% HFC-125 (CHF_2-CF_3): 15% HFC-134a (CF_3-CH_2F): 52.5%	1 495	1 378	1 495
R-407I	HFC-32 (CH_2F_2): 19.5% HFC-125 (CHF_2-CF_3): 8.5% HFC-134a (CF_3-CH_2F): 72%	1 459	1 337	1 459
R-410A	HFC-32 (CH_2F_2): 50% HFC-125 (CHF_2-CF_3): 50%	2 088	1 924	2 088
R-410B	HFC-32 (CH_2F_2): 45% HFC-125 (CHF_2-CF_3): 55%	2 229	2 048	2 229
R-413A	HFC-134a (CH_2F-CF_3): 88% PFC-218 (CF_3-CF_2-CF_3): 9% R-600a ($(CH_3)_2CH$-CH_3) [1]: 3%	2 053	1 945 [1]	2 095
R-417A	HFC-125 (CHF_2-CF_3): 46.6% HFC-134a (CH_2F-CF_3): 50% R-600 (CH_3-CH_2-CH_2-CH_3) [1]: 3.4%	2 346	2 127 [1]	2 346

Industrial nomenclature	Formula / Composition	GWP AR4 [1]	GWP AR5 [3]	GWP F-gas R. [5]
R-417B	HFC-125 (CHF_2-CF_3): 79% HFC-134a (CH_2F-CF_3): 18.3% R-600 (CH_3-CH_2-CH_2-CH_3) [1]: 2.7%	3 027	2 742 [1]	3 027
R-417C	HFC-125 (CHF_2-CF_3): 19.5% HFC-134a (CH_2F-CF_3): 78.8% R-600 (CH_3-CH_2-CH_2-CH_3) [1]: 1.7%	1 809	1 643 [1]	1 809
R-419A	HFC-125 (CHF_2-CF_3): 77% HFC-134a (CF_3-CH_2F): 19% R-E170 (CH_3-O-CH_3) [1]: 4%	2 967	2 688 [1]	2 967
R-419B	HFC-125 (CHF_2-CF_3): 48.5% HFC-134a (CF_3-CH_2F): 48% R-E170 (CH_3-O-CH_3) [1]: 3.5%	2 384	2 161 [1]	2 384
R-421A	HFC-125 (CHF_2-CF_3): 58% HFC-134a (CF_3-CH_2F): 42%	2 631	2 385	2 631
R-421B	HFC-125 (CHF_2-CF_3): 85% HFC-134a (CF_3-CH_2F): 15%	3 190	2 890	3 190
R-422A	HFC-125 (CHF_2-CF_3): 85.1% HFC-134a (CF_3-CH_2F): 11.5% R-600a ($(CH_3)_2$CH-CH_3) [1]: 3.4%	3 143	2 847 [1]	3 143
R-422B	HFC-125 (CHF_2-CF_3): 55% HFC-134a (CF_3-CH_2F): 42% R-600a ($(CH_3)_2$CH-CH_3) [1]: 3%	2 526	2 290 [1]	2 526
R-422C	HFC-125 (CHF_2-CF_3): 82% HFC-134a (CF_3-CH_2F): 15% R-600a ($(CH_3)_2$CH-CH_3) [1]: 3%	3 085	2 794 [1]	3 085
R-422D	HFC-125 (CHF_2CF_3): 65.1% HFC-134a (CF_3-CH_2F): 31.5% R-600a ($(CH_3)_2$CH-CH_3) [1]: 3.4%	2 729	2 473 [1]	2 729
R-422E	HFC-125 (CHF_2CF_3): 58% HFC-134a (CF_3-CH_2F): 39.3% R-600a ($(CH_3)_2$CH-CH_3) [1]: 2.7%	2 592	2 350 [1]	2 592
R-423A	HFC-134a (CF_3-CH_2F): 52.5% HFC-227ea (CF_3-CHF-CF_3): 47.5%	2 280	2 274	2 280
R-424A	HFC-125 (CHF_2-CF_3): 50.5% HFC-134a (CF_3-CH_2F): 47% R-600 (CH_3-CH_2-CH_2-CH_3) [1]: 1% R-600a ($(CH_3)_2$CH-CH_3) [1]: 0.9% R-601a ($(CH_3)_2$CH-CH_2-CH_3) [4]: 0.6%	2 440 [4]	2 212 [1,4]	2 280
R-425A	HFC-32 (CH_2F_2): 18.5% HFC-134a (CF_3-CH_2F): 69.5% HFC-227ea (CF_3-CHF-CF_3): 12%	1 505	1 431	1 505

Industrial nomenclature	Formula / Composition	GWP AR4 [1]	GWP AR5 [3]	GWP F-gas R. [5]
R-426A	HFC-125 (CHF_2-CF_3): 5.1% HFC-134a (CF_3-CH_2F): 93% R-600 (CH_3-CH_2-CH_2-CH_3) [1]: 1.3% R-601a ($(CH_3)_2CH$-CH_2-CH_3) [4]: 0.6%	1 508 [4]	1 371 [1,4]	1 508
R-427A	HFC-32 (CH_2F_2): 15% HFC-125 (CHF_2-CF_3): 25% HFC-134a (CF_3-CH_2F): 50% HFC-143a (CH_3-CF_3): 10%	2 138	2 024	2 138
R-427B	HFC-32 (CH_2F_2): 20.6% HFC-125 (CHF_2-CF_3): 25.6% HFC-134a (CF_3-CH_2F): 34.8% HFC-143a (CH_3-CF_3): 19%	2 382	2 315	2 382
R-427C	HFC-32 (CH_2F_2): 25% HFC-125 (CHF_2-CF_3): 25% HFC-134a (CF_3-CH_2F): 40% HFC-143a (CH_3-CF_3): 10%	2 063	1 962	2 063
R-428A	HFC-125 (CHF_2-CF_3): 77.5% HFC-143a (CH_3-CF_3): 20% R-290 (CH_3-CH_2-CH_3) [1]: 0.6% R-600a ($(CH_3)_2CH$-CH_3) [1]: 1.9%	3 607	3 417 [1]	3 607
R-429A	HFC-152a (CHF_2-CH_3): 10% R-E170 (CH_3-O-CH_3) [1]: 60% R-600a ($(CH_3)_2CH$-CH_3) [1]: 30%	14	15 [1]	13
R-430A	HFC-152a (CHF_2-CH_3): 76% R-600a ($(CH_3)_2CH$-CH_3) [1]: 24%	95	106 [1]	94
R-431A	HFC-152a (CHF_2-CH_3): 29% R-290 (CH_3-CH_2-CH_3) [1]: 71%	38	42 [1]	36
R-434A	HFC-125 (CHF_2-CF_3): 63.2% HFC-134a (CF_3-CH_2F): 16% HFC-143a (CH_3-CF_3): 18% R-600a ($(CH_3)_2CH$-CH_3) [1]: 2.8%	3 245	3 076 [1]	3 245
R-435A	HFC-152a (CHF_2-CH_3): 20% R-E170 (CH_3-O-CH_3) [1]: 80%	26	28 [1]	26
R-437A	HFC-125 (CHF_2-CF_3): 19.5% HFC-134a (CF_3-CH_2F): 78.5% R-600 (CH_3-CH_2-CH_2-CH_3) [1]: 1.4% R-601 (CH_3-CH_2-CH_2-CH_2-CH_3) [4]: 0.6%	1 805 [4]	1 639 [1,4]	1 805
R-438A	HFC-32 (CH_2F_2): 8.5% HFC-125 (CHF_2-CF_3): 45% HFC-134a (CF_3-CH_2F): 44.2% R-600 (CH_3-CH_2-CH_2-CH_3) [1]: 1.7% R-601a ($(CH_3)_2CH$-CH_2-CH_3) [4]: 0.6%	2 265 [4]	2 059 [1,4]	2 264

Industrial nomenclature	Formula / Composition	GWP AR4 [1]	GWP AR5 [3]	GWP F-gas R. [5]
R-439A	HFC-32 (CH_2F_2): 50% HFC-125 (CHF_2-CF_3): 47% R-600a ($(CH_3)_2CH$-CH_3) [1]: 3%	1 983	1 828 [1]	1 983
R-440A	HFC-134a (CF_3-CH_2F): 1.6% HFC-152a (CHF_2-CH_3): 97.8% R-290 (CH_3-CH_2-CH_3) [1]: 0.6%	144	156 [1]	144
R-442A	HFC-32 (CH_2F_2): 31% HFC-125 (CHF_2-CF_3): 31% HFC-134a (CF_3-CH_2F): 30% HFC-152a (CHF_2-CH_3): 3% HFC-227ea (CF_3-CHF-CF_3): 5%	1 888	1 754	1 888
R-444A	HFC-32 (CH_2F_2): 12% HFC-152a (CHF_2-CH_3): 5% HFC-1234ze (E) (CHF=CH-CF_3) [2]: 83%	93 [2]	89	88
R-444B	HFC-32 (CH_2F_2): 41.5% HFC-152a (CHF_2-CH_3): 10% HFC-1234ze (E) (CHF=CH-CF_3) [2]: 48.5%	296 [2]	295	293
R-445A	HFC-134a (CF_3-CH_2F): 9% HFC-1234ze (E) (CHF=CH-CF_3) [2]: 85% R-744 (CO_2): 6%	135 [2]	118	130
R-446A	HFC-32 (CH_2F_2): 68% HFC-1234ze (E) (CHF=CH-CF_3) [2]: 29% R-600 (CH_3-CH_2-CH_2-CH_3) [1]: 3%	461 [2]	461 [1]	459
R-447A	HFC-32 (CH_2F_2): 68% HFC-125 (CHF_2-CF_3): 3.5% HFC-1234ze (E) (CHF=CH-CF_3) [2]: 28.5%	583 [2]	572	582
R-447B	HFC-32 (CH_2F_2): 68% HFC-125 (CHF_2-CF_3): 8% HFC-1234ze (E) (CHF=CH-CF_3) [2]: 24%	741 [2]	714	739
R-448A	HFC-32 (CH_2F_2): 26% HFC-125 (CHF_2-CF_3): 26% HFC-134a (CF_3-CH_2F): 21% HFC-1234yf (CH_2=CF-CF_3) [2]: 20% HFC-1234ze (E) (CHF=CH-CF_3) [2]: 7%	1 387 [2]	1 273	1 386
R-448B	HFC-32 (CH_2F_2): 21% HFC-125 (CHF_2-CF_3): 21% HFC-134a (CF_3-CH_2F): 31% HFC-1234yf (CH_2=CF-CF_3) [2]: 20% HFC-1234ze (E) (CHF=CH-CF_3) [2]: 7%	1 321 [2]	1 211	1 320
R-449A	HFC-32 (CH_2F_2): 24.3% HFC-125 (CHF_2-CF_3): 24.7% HFC-134a (CF_3-CH_2F): 25.7% HFC-1234yf (CH_2=CF-CF_3) [2]: 25.3%	1 397 [2]	1 282	1 396

Industrial nomenclature	Formula / Composition	GWP AR4 [1]	GWP AR5 [3]	GWP F-gas R. [5]
R-449B	HFC-32 (CH_2F_2): 25.2% HFC-125 (CHF_2-CF_3): 24.3% HFC-134a (CF_3-CH_2F): 27.3% HFC-1234yf (CH_2=CF-CF_3) [2]: 23.2%	1 412 [2]	1 296	1 411
R-449C	HFC-32 (CH_2F_2): 20% HFC-125 (CHF_2-CF_3): 20% HFC-134a (CF_3-CH_2F): 29% HFC-1234yf (CH_2=CF-CF_3) [2]: 31%	1 251 [2]	1 147	1 250
R-450A	HFC-134a (CF_3-CH_2F): 42% HFC-1234ze (E) (CHF=CH-CF_3) [2]: 58%	605 [2]	547	601
R-451A	HFC-134a (CF_3-CH_2F): 10.2% HFC-1234yf (CH_2=CF-CF_3) [2]: 89.8%	149 [2]	133	146
R-451B	HFC-134a (CF_3-CH_2F): 11.2% HFC-1234yf (CH_2=CF-CF_3) [2]: 88.8%	164 [2]	146	161
R-452A	HFC-32 (CH_2F_2): 11% HFC-125 (CHF_2-CF_3): 59% HFC-1234yf (CH_2=CF-CF_3) [2]: 30%	2 140 [2]	1 945	2 139
R-452B	HFC-32 (CH_2F_2): 67% HFC-125 (CHF_2-CF_3): 7% HFC-1234yf (CH_2=CF-CF_3) [2]: 26%	698 [2]	676	697
R-452C	HFC-32 (CH_2F_2): 12.5% HFC-125 (CHF_2-CF_3): 61% HFC-1234yf (CH_2=CF-CF_3) [2]: 26.5%	2 220 [2]	2 019	2 220
R-453A	HFC-32 (CH_2F_2): 20% HFC-125 (CHF_2-CF_3): 20% HFC-134a (CF_3-CH_2F): 53.8% HFC-227ea (CF_3-CHF-CF_3): 5% R-600 (CH_3-CH_2-CH_2-CH_3) [1]: 0.6% R-601a ($(CH_3)_2$CH-CH_2-CH_3) [4]: 0.6%	1 765 [4]	1 636 [1,4]	1 765
R-454A	HFC-32 (CH_2F_2): 35% HFC-1234yf (CH_2=CF-CF_3) [2]: 65%	239 [2]	238	237
R-454B	HFC-32 (CH_2F_2): 68.9% HFC-1234yf (CH_2=CF-CF_3) [2]: 31.1%	466 [2]	467	465
R-454C	HFC-32 (CH_2F_2): 21.5% HFC-1234yf (CH_2=CF-CF_3) [2]: 78.5%	148 [2]	146	146
R-454D	HFC-32 (CH_2F_2): 43% HFC-1234yf (CH_2=CF-CF_3) [2]: 57%	293 [2]	292	291
R-455A	HFC-32 (CH_2F_2): 21.5% HFC-1234yf (CH_2=CF-CF_3) [2]: 75.5% R-744 (CO_2): 3%	148 [2]	146	146
R-455B	HFC-32 (CH_2F_2): 42% HFC-1234yf (CH_2=CF-CF_3) [2]: 52% R-744 (CO_2): 6%	286 [2]	285	284

Industrial nomenclature	Formula / Composition	GWP AR4 [1]	GWP AR5 [3]	GWP F-gas R. [5]
R-455C	HFC-32 (CH_2F_2): 43% HFC-1234yf (CH_2=CF-CF_3) [2]: 54% R-744 (CO_2): 3%	292 [2]	292	291
R-456A	HFC-32 (CH_2F_2): 6% HFC-134a (CF_3-CH_2F): 45% HFC-1234ze (E) (CHF=CH-CF_3) [2]: 49%	687 [2]	626	685
R-457A	HFC-32 (CH_2F_2): 18% HFC-152a (CHF_2-CH_3): 12% HFC-1234yf (CH_2=CF-CF_3) [2]: 70%	139 [2]	139	137
R-457B	HFC-32 (CH_2F_2): 35% HFC-152a (CHF_2-CH_3): 10% HFC-1234yf (CH_2=CF-CF_3) [2]: 55%	251 [2]	251	249
R-457C	HFC-32 (CH_2F_2): 7.5% HFC-152a (CHF_2-CH_3): 14.5% HFC-1234yf (CH_2=CF-CF_3) [2]: 78%	72 [2]	72	69
R-457D	HFC-32 (CH_2F_2): 4% HFC-152a (CHF_2-CH_3): 14% HFC-1234yf (CH_2=CF-CF_3) [2]: 82%	48 [2]	47	45
R-458A	HFC-32 (CH_2F_2): 20.5% HFC-125 (CHF_2-CF_3): 4% HFC-134a (CF_3-CH_2F): 61.4% HFC-227ea (CF_3-CHF-CF_3): 13.5% HFC-236fa (CF_3-CH_2-CF_3): 0.6%	1 650	1 564	1 650
R-459A	HFC-32 (CH_2F_2): 68% HFC-1234yf (CH_2=CF-CF_3) [2]: 26% HFC-1234ze (E) (CF_3-CH=CHF) [2]: 6%	460 [2]	461	459
R-459B	HFC-32 (CH_2F_2): 21% HFC-1234yf (CH_2=CF-CF_3) [2]: 69% HFC-1234ze (E) (CF_3-CH=CHF) [2]: 10%	145 [2]	143	142
R-460A	HFC-32 (CH_2F_2): 12% HFC-125 (CHF_2-CF_3): 52% HFC-134a (CF_3-CH_2F): 14% HFC-1234ze (E) (CHF=CH-CF_3) [2]: 22%	2 103 [2]	1 912	2 102
R-460B	HFC-32 (CH_2F_2): 28% HFC-125 (CHF_2-CF_3): 25% HFC-134a (CF_3-CH_2F): 20% HFC-1234ze (E) (CHF=CH-CF_3) [2]: 27%	1 352 [2]	1 242	1 350
R-460C	HFC-32 (CH_2F_2): 2.5% HFC-125 (CHF_2-CF_3): 2.5% HFC-134a (CF_3-CH_2F): 46% HFC-1234ze (E) (CHF=CH-CF_3) [2]: 49%	766 [2]	695	763

Industrial nomenclature	Formula / Composition	GWP AR4 [1]	GWP AR5 [3]	GWP F-gas R. [5]
R-461A	HFC-125 (CHF_2-CF_3): 55% HFC-134a (CH_2F-CF_3): 32% HFC-143a (CH_3-CF_3): 5% HFC-227ea (CF_3-CHF-CF_3): 5% R-600a ($(CH_3)_2CH$-CH_3) [1]: 3%	2 767	2 567 [1]	2 767
R-462A	HFC-32 (CH_2F_2): 9% HFC-125 (CHF_2-CF_3): 42% HFC-134a (CH_2F-CF_3): 44% HFC-143a (CH_3-CF_3): 2% R-600 (CH_3-CH_2-CH_2-CH_3) [1]: 3%	2 249	2 060 [1]	2 249
R-463A	HFC-32 (CH_2F_2): 36% HFC-125 (CHF_2-CF_3): 30% HFC-134a (CH_2F-CF_3): 14% HFC-1234yf (CH_2=CF-CF_3) [2]: 14% R-744 (CO_2): 6%	1 494 [2]	1 377	1 493
R-464A	HFC-32 (CH_2F_2): 27% HFC-125 (CHF_2-CF_3): 27% HFC-227ea (CF_3-CHF-CF_3): 6% HFC-1234ze (E) (CHF=CH-CF_3) [2]: 40%	1 323 [2]	1 240	1 321
R-465A	HFC-32 (CH_2F_2): 21% HFC-1234yf (CH_2=CF-CF_3) [2]: 71.1% R-290 (CH_3-CH_2-CH_3) [1]: 7.9%	145 [2]	143 [1]	142
R-466A	HFC-32 (CH_2F_2): 49% HFC-125 (CHF_2-CF_3): 11.5% R-13I1 (CF_3I) [1]: 39.5%	733	696 [1]	733
R-467A	HFC-32 (CH_2F_2): 22% HFC-125 (CHF_2-CF_3): 5% HFC-134a (CF_3-CH_2F): 72.4% R-600a ($(CH_3)_2CH$-CH_3) [1]: 0.6%	1 359	1 249 [1]	1 359
R-468A	HFC-32 (CH_2F_2): 21.5% HFC-1234yf (CH_2=CF-CF_3) [2]: 75% HFC-1132a (CH_2=CF_2) [3]: 3.5%	148 [2,3]	146	146
R-468B	HFC-32 (CH_2F_2): 13% HFC-1234yf (CH_2=CF-CF_3) [2]: 81% HFC-1132a (CH_2=CF_2) [3]: 6%	91 [2,3]	89	88
R-468C	HFC-32 (CH_2F_2): 42% HFC-1234yf (CH_2=CF-CF_3) [2]: 52% HFC-1132a (CH_2=CF_2) [3]: 6%	286 [2,3]	285	284
R-469A	HFC-32 (CH_2F_2): 32.5% HFC-125 (CHF_2-CF_3): 32.5% R-744 (CO_2): 35%	1 357	1 251	1 357

Industrial nomenclature	Formula / Composition	GWP AR4 [1]	GWP AR5 [3]	GWP F-gas R. [5]
R-470A	HFC-32 (CH_2F_2): 17% HFC-125 (CHF_2-CF_3): 19% HFC-134a (CF_3-CH_2F): 7% HFC-227ea (CF_3-CHF-CF_3): 3% HFC-1234ze (E) (CHF=CH-CF_3) [2]: 44% R-744 (CO_2): 10%	980 [2]	909	977
R-470B	HFC-32 (CH_2F_2): 11.5% HFC-125 (CHF_2-CF_3): 11.5% HFC-134a (CF_3-CH_2F): 3% HFC-227ea (CF_3-CHF-CF_3): 7% HFC-1234ze (E) (CHF=CH-CF_3) [2]: 57% R-744 (CO_2): 10%	753 [2]	717	749
R-471A	HFC-227ea (CF_3-CHF-CF_3): 4.3% HFC-1234ze (E) (CHF=CH-CF_3) [2]: 78.7% HFC-1336mzz (E) (CHF_2-CF_3) [5]: 17.0%	147 [2,5]	148 [5]	143
R-472A	HFC-32 (CH_2F_2): 12% HFC-134a (CF_3-CH_2F): 19% R-744 (CO_2): 69%	353	329	353
R-472B	HFC-32 (CH_2F_2): 10% HFC-134a (CF_3-CH_2F): 32% R-744 (CO_2): 58%	526	484	526
R-473A	HFC-23 (CHF_3): 10% HFC-125 (CHF_2-CF_3): 10% HFC-1132a (CH_2=CF_2) [3]: 20% R-744 (CO_2): 60%	1 831 [3]	1 558	1 831
R-474A	HFC-1132 (E) (CHF=CHF) [3]: 23% HFC-1234yf (CH_2=CF-CF_3) [2]: 77%	3 [2,3]	1	1
R-474B	HFC-1132 (E) (CHF=CHF) [3]: 31.5% HFC-1234yf (CH_2=CF-CF_3) [2]: 68.5%	3 [2,3]	1	1
R-475A	HFC-134a (CF_3-CH_2F): 43% HFC-1234yf (CH_2=CF-CF_3) [2]: 45% HFC-1234ze (E) (CF_3-CH=CHF) [2]: 12%	618 [2]	560	615
R-475B	HFC-134a (CF_3-CH_2F): 10.1% HFC-1234yf (CH_2=CF-CF_3) [2]: 35.4% HFC-1234ze (E) (CF_3-CH=CHF) [2]: 54.5%	150 [2]	132	145
R-476A	HFC-134a (CF_3-CH_2F): 10% HFC-1234ze (E) (CF_3-CH=CHF) [2]: 78% HFC-1336mzz (E) (CF_3-CH=CH-CF_3) [5]: 12%	151 [2,5]	133 [5]	146

Industrial nomenclature	Formula / Composition	GWP AR4 [1]	GWP AR5 [3]	GWP F-gas R. [5]
R-478A	HFC-32 (CH_2F_2): 26% HFC-125 (CHF_2-CF_3): 15% HFC-134a (CF_3-CH_2F): 15% HFC-152a (CHF_2-CH_3): 3% HFC-227ea (CF_3-CHF-CF_3): 4% HFC-1234ze (E) (CF_3-CH=CHF) [2]: 30% R-744 (CO_2): 7%	1 050 [2]	985	1 048
R-479A	HFC-32 (CH_2F_2): 21.5% HFC-1132 (E) (CHF=CHF) [3]: 28% HFC-1234yf (CH_2=CF-CF_3) [2]: 50.5%	147 [2,3]	146	146
R-479B	HFC-32 (CH_2F_2): 44% HFC-1132 (E) (CHF=CHF) [3]: 23% HFC-1234yf (CH_2=CF-CF_3) [2]: 33%	299 [2,3]	298	297
R-480A	HFC-227ea (CF_3-CHF-CF_3): 9% HFC-1234ze (E) (CF_3-CH=CHF) [2]: 86% R-744 (CO_2): 5%	296 [2]	302	291
R-481A	HFC-32 (CH_2F_2): 16.9% HFC-125 (CHF_2-CF_3): 6.3% HFC-134a (CF_3-CH_2F): 74.4% HCFC-1233zd (E) (CHCl=CH-CF_3) [2]: 1.8% R-601a ($(CH_3)_2$CH-CH_2-CH_3) [4]: 0.6%	1 399 [2,4]	1 281 [4]	1 399
R-482A	HFC-134a (CF_3-CH_2F): 10% HCFC-1224yd (Z) (CHCl=CF-CF_3) [3]: 6.5% HFC-1234ze (E) (CF_3-CH=CHF) [2]: 83.5%	143 [2,3]	130	143
R-485A	HFC-32 (CH_2F_2): 21% HFC-1132a (CH_2=CF_2) [3]: 10% R-744 (CO_2): 69%	143	143	142
R-486A	HFC-134a (CF_3-CH_2F): 6.3% HFC-1234yf (CH_2=CF-CF_3) [2]: 21.9% HFC-1234ze (E) (CF_3-CH=CHF) [2]: 33.8% R-13I1 (CF_3I) [1]: 38%	93 [2]	83 [1]	91 [1]
R-488A	HFC-32 (CH_2F_2): 6% HFC-152a (CHF_2-CH_3): 3% HFC-1234yf (CH_2=CF-CF_3) [2]: 50% HFC-1234ze (E) (CF_3-CH=CHF) [2]: 41%	49 [2]	46	45
R-491A	HFC-152a (CH_3-CHF_2): 65% HFC-1132 (E) (CHF=CHF) [2]: 35%	81 [2]	90	81
R-492A	HFC-32 (CH_2F_2): 18% HFC-152a (CH_3-CHF_2): 14% HFC-1132a (CH_2=CF_2) [2]: 12% HFC-1234ze (CHF=CH-CF_3) [2]: 56%	143 [2]	142	140
R-494A	HFC-152a (CH_3-CHF_2): 60% R-13I1 (CF_3I) [1]: 36% R-744 (CO_2): 4%	75	83 [1]	75 [1]

Industrial nomenclature	Formula / Composition	GWP AR4 [1]	GWP AR5 [3]	GWP F-gas R. [5]
R-494B	HFC-152a (CH_3-CHF_2): 38% R-13I1 (CF_3I) [1]: 58% R-744 (CO_2): 4%	47	53 [1]	47 [1]
R-495A	HFC-32 (CH_2F_2): 4.5% HFC-134a (CF_3-CH_2F): 9% HFC-1234yf (CH_2=CF-CF_3) [2]: 76% HFC-1234ze (E) (CF_3-CH=CHF) [2]: 10.5%	163 [2]	148	160
R-496A	PFC-14 (CF_4): 18% HFC-23 (CHF_3): 37.8% PFC-116 (C_2F_6): 44.2%	12 317	10 787	12 404
R-497A	R-1270 (CH_2=CH-CH_3): 15% R-13I1 (CF_3I) [1]: 85%	0.6	0.6 [1]	0.3 [1]
R-498A	R-170 (CH_3-CH_3): 7% R-290 (CH_3-CH_2-CH_3) [1]: 8% R-13I1 (CF_3I) [1]: 85%	1	1 [1]	0.4 [1]
R-4101A	HFC-32 (CH_2F_2): 11% HFC-152a (CH_3-CHF_2): 30.5% R-13I1 (CF_3I) [1]: 58.5%	112	117 [1]	112 [1]
R-4102A	HFC-134a (CF_3-CH_2F): 10% HFC-1234ze (E) (CF_3-CH=CHF) [2]: 60% HFC-1233zd (E) (CHCl=CH-CF_3) [2]: 30%	149 [2]	131	145
R-4103A	HFC-32 (CH_2F_2): 10% HFC-152a (CH_3-CHF_2): 22% HFC-1234ze (E) (CF_3-CH=CHF) [2]: 51% R-13I1 (CF_3I) [1]: 17%	98 [2]	99 [1]	96 [1]
R-507A	HFC-125 (CHF_2-CF_3): 50% HFC-143a (CH_3-CF_3): 50%	3 985	3 985	3 985
R-508A	HFC-23 (CHF_3): 39% PFC-116 (C_2F_6): 61%	13 214	11 607	13 336
R-508B	HFC-23 (CHF_3): 46% PFC-116 (C_2F_6): 54%	13 396	11 698	13 504
R-512A	HFC-134a (CF_3-CH_2F): 5% HFC-152a (CHF_2-CH_3): 95%	189	196	189
R-513A	HFC-134a (CF_3-CH_2F): 44% HFC-1234yf (CH_2=CF-CF_3) [2]: 56%	631 [2]	573	629
R-513B	HFC-134a (CF_3-CH_2F): 41.5% HFC-1234yf (CH_2=CF-CF_3) [2]: 58.5%	596 [2]	540	594
R-514A	HFC-1336mzz (Z) (CF_3-CH=CH-CF_3) [2]: 74.7% HCC-1130 (E) (CHCl=CHCl) [3]: 25.3%	7 [2,3]	2	2 [3]
R-515A	HFC-227ea (CF_3-CHF-CF_3): 12% HFC-1234ze (E) (CHF=CH-CF_3) [2]: 88%	393 [2]	403	388
R-515B	HFC-227ea (CF_3-CHF-CF_3): 8.9% HFC-1234ze (E) (CHF=CH-CF_3) [2]: 91.1%	293 [2]	299	288

Industrial nomenclature	Formula / Composition	GWP AR4 [1]	GWP AR5 [3]	GWP F-gas R. [5]
R-516A	HFC-134a (CF_3-CH_2F): 8.5% HFC-152a (CHF_2-CH_3): 14% HFC-1234yf (CH_2=CF-CF_3) [2]: 77.5%	142 [2]	131	139
Isceon® MO89	HFC-125 (CF_3-CHF_2): 86% PFC-218 (CF_3-CF_2-CF_3): 9% R-290 (CH_3-CH_2-CH_3) [1]: 5%	3 805	3 527 [1]	3 846

[1] GWP_{100} taken from: Climate Change 2007: *The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 996 pp.

[2] GWP_{100} taken from: WMO (World Meteorological Organization), Scientific Assessment of Ozone Depletion: 2010, Global Ozone Research and Monitoring Project–Report No. 52, Geneva, Switzerland, 2010.

[3] GWP_{100} taken from: Climate Change 2013: *The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 1535 pp.

[4] Standard value based on GWP_{100} of other hydrocarbons.

[5] GWP_{100} taken from: Regulation (EU) 2024/573 of the European Parliament and of the Council of 7 February 2024 on fluorinated greenhouse gases, amending Directive (EU) 2019/1937 and repealing Regulation (EU) No 517/2014. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32024R0573 (03/07/2024).

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