

CF-S SUS 1.1 Methodology for Product Carbon Footprint Calculation

7.1 Appendix A: Characterization factors for climate change according to IPCC

Elementary flow	Characterization factor in kg CO _{2e} /kg elementary flow
Carbon dioxide	1,000
Methane, non fossil	27,000
Methane, fossil	29,800
Nitrous oxide	273,000
CFC-11	6226,000
CFC-12	11200,000
CFC-13	16200,000
CFC-112	4620,000
CFC-112a	3550,000
CFC-113	6520,000
CFC-113a	3930,000
CFC-114	9430,000
CFC-114a	7420,000
CFC-115	9600,000
E-R316c	4230,000
Z-R316c	5660,000
CFC 1112	0,126
CFC 1112a	0,021
HCFC-21	160,000
HCFC-22	1960,000
HCFC-31	79,400
HCFC-121	58,300
HCFC-122	56,400
HCFC-122a	245,000
HCFC-123	90,400
HCFC-123a	395,000
HCFC-124	597,000
HCFC-124a	2070,000
HCFC-132	122,000
HCFC-132a	70,400
HCFC-132c	342,000
HCFC-133a	388,000
HCFC-141	46,600
HCFC-141b	860,000
HCFC-142b	2300,000
HCFC-225ca	137,000

CF-S SUS 1.1 Methodology for Product Carbon Footprint Calculation

HCFC-225cb	568,000
HCFO-1233zd(E)	3,880
HCFO-1233zd(Z)	0,454
(e)-1-chloro-2-fluoroethene	0,004
HFC-23	14600,000
HFC-32	771,000
HFC-41	135,000
HFC-125	3740,000
HFC-134	1260,000
HFC-134a	1526,000
HFC-143	364,000
HFC-143a	5810,000
HFC-152	21,500
HFC-152a	164,000
HFC-161	4,840
HFC-227ca	2980,000
HFC-227ea	3600,000
HFC-236cb	1350,000
HFC-236ea	1500,000
HFC-236fa	8690,000
HFC-245ca	787,000
HFC-245cb	4550,000
HFC-245ea	255,000
HFC-245eb	325,000
HFC-245fa	962,000
HFC-263fb	74,800
HFC-272ca	599,000
HFC-329p	2890,000
HFC-365mfc	914,000
HFC-43-10mee	1600,000
HFO-1123	0,005
HFO-1132a	0,052
HFO-1141	0,024
HFO-1225ye(Z)	0,344
HFO-1225ye(E)	0,118
HFO-1234ze(Z)	0,315
HFO-1234ze(E)	1,370
HFO-1234yf	0,501
HFO-1336mzz(E)	17,900
HFO-1336mzz(Z)	2,080
HFO-1243zf	0,261

CF-S SUS 1.1 Methodology for Product Carbon Footprint Calculation

HFO-1345zfc	0,182
3,3,4,4,5,5,6,6,6-nonafluorohex-1-ene	0,204
3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooct-1-ene	0,162
3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,10-heptadecafluorodec-1-ene	0,141
3,3,3-trifluoro-2-(trifluoromethyl)prop-1-ene	0,377
1,1,2,2,3,3-hexafluorocyclopentane	120,000
1,1,2,2,3,3,4-heptafluorocyclopentane	231,000
1,3,3,4,4,5,5-heptafluorocyclopentene	45,100
(4s,5s)-1,1,2,2,3,3,4,5-octafluorocyclopentane	258,000
HFO-1438ezy(E)	8,220
HFO-1447fz	0,235
1,3,3,4,4-pentafluorocyclobutene	92,400
3,3,4,4-tetrafluorocyclobutene	25,600
Methyl chloroform	161,000
Carbon tetrachloride	2200,000
Methyl chloride	5,540
Methylene chloride	11,200
Chloroform	20,600
Chloroethane	0,481
1,2-dichloroethane	1,300
1,1,2-trichloroethene	0,044
1,1,2,2-tetrachloroethene	6,340
2-chloropropane	0,181
1-chlorobutane	0,007
Methyl bromide	2,430
Methylene bromide	1,510
Halon-1201	380,000
Halon-1202	216,000
Halon-1211	1930,000
Halon-1301	7200,000
Halon-2301	177,000
Halon-2311	45,000
Halon-2401	201,000
Halon-2402	2170,000
Tribromomethane	0,250
Halon-1011	4,740
Bromoethane	0,487
1,2-dibromoethane	1,020
1-bromopropane	0,052
2-bromopropane	0,126
Nitrogen trifluoride	17400,000

CF-S SUS 1.1 Methodology for Product Carbon Footprint Calculation

Pentadecafluorotriethylamine	10300,000
Perfluorotripropylamine	9030,000
Heptacosafuorotributylamine	8490,000
Perfluorotripentylamine	7260,000
Heptafluoroisobutyronitrile	2750,000
Sulfur hexafluoride	25200,000
Trifluoromethylsulfurpentafluoride	18500,000
Sulfuryl fluoride	4630,000
PFC-14	7380,000
PFC-116	12400,000
PFC-218	9290,000
Hexafluorocyclobutene	126,000
PFC-C-318	10200,000
PFC-31-10	10000,000
Octafluorocyclopentene	78,100
PFC-41-12	9220,000
PFC-51-14	8620,000
PFC-61-16	8410,000
PFC-71-18	8260,000
PFC-91-18	7480,000
1,1,2,2,3,3,4,4,4a,5,5,6,6,7,7,8,8,8a-octadecafluoronaphthalene	7800,000
1,1,2,2,3,3,4,4,4a,5,5,6,6,7,7,8,8,8a-octadecafluoronaphthalene	7120,000
PFC-1114	0,004
PFC-1216	0,090
1,1,2,3,4,4-hexafluorobuta-1,3-diene	0,004
Octafluoro-1-butene	0,102
Octafluoro-2-butene	1,970
HFE-125	14300,000
HFE-134	6630,000
HFE-143a	616,000
HFE-227ea	7520,000
HCFE-235ca2	654,000
HCFE-235da2	539,000
HCFE-236ea2	2590,000
HFE-236fa	1100,000
HFE-245cb2	747,000
HFE-245fa1	934,000
HFE-245fa2	878,000
2,2,3,3,3-pentafluoropropan-1-ol	34,300
HFE-254cb1	328,000
HFE-263mf	2,060

CF-S SUS 1.1 Methodology for Product Carbon Footprint Calculation

HFE-263m1	29,200
3,3,3-trifluoropropan-1-ol	0,620
HFE-329mcc2	3770,000
HFE-338mmz1	3040,000
HFE-338mcf2	1040,000
HFE-347mmz1	195,000
HFE-347mcc3	576,000
HFE-347mcf2	963,000
HFE-347pcf2	980,000
HFE-347mmy1	392,000
HFE-356mec3	264,000
HFE-356mff2	24,400
HFE-356pcf2	831,000
HFE-356pcf3	484,000
HFE-356pcc3	277,000
HFE-356mmz1	8,130
HFE-365mcf3	1,600
HFE-374pc2	12,500
4,4,4-trifluorobutan-1-ol	0,049
2,2,3,3,4,4,5,5-octafluorocyclopentan-1-ol	13,600
HFE-43-10pccc124	3220,000
HFE-449s1	460,000
n-HFE-7100	544,000
i-HFE-7100	437,000
HFE-569sf2	60,700
i-HFE-7200	34,300
HFE-7300	405,000
HFE-7500	13,000
HFE-236ca12	6060,000
HFE-338pcc13	3320,000
1,1,1,3,3,3-hexafluoropropan-2-ol	206,000
HG-02	5730,000
HG-03	5350,000
Fluorene	0,058
2-ethoxy-3,3,4,4,5-pentafluorotetrahydro-2,5-bis[1,2,2,2-tetrafluoro-1-(trifluoromethyl)ethyl]-furan	48,700
Difluoro(methoxy)methane	136,000
HG'-01	202,000
HG'-02	229,000
HG'-03	219,000
HFE-329me3	4390,000

CF-S SUS 1.1 Methodology for Product Carbon Footprint Calculation

3,3,4,4,5,5,6,6,7,7,7-undecafluoroheptan-1-ol	0,533
3,3,4,4,5,5,6,6,7,7,8,8,9,9,9-pentadecafluorononan-1-ol	0,449
3,3,4,4,5,5,6,6,7,7,8,8,9,9,10,10,11,11,11-nonadecafluoroundecan-1-ol	0,273
2-chloro-1,1,2-trifluoro-1-methoxyethane	136,000
PFPME	10300,000
HFE-216	0,010
Perfluoroethyl formate	597,000
2,2,2-trifluoroethyl formate	54,800
Formic acid;1,1,1,3,3,3-hexafluoropropan-2-ol	269,000
Ethenyl 2,2,2-trifluoroacetate	0,008
Ethyl 2,2,2-trifluoroacetate	1,580
Prop-2-enyl 2,2,2-trifluoroacetate	0,007
Methyl 2,2,2-trifluoroacetate	82,300
2,2,3,3,4,4,4-heptafluorobutan-1-ol	36,500
1,1,2-trifluoro-2-(trifluoromethoxy)ethane	1260,000
1-ethoxy-1,1,2,3,3,3-hexafluoropropane	26,400
1,1,1,2,2,3,3-heptafluoro-3-(1,2,2,2-tetrafluoroethoxy)propane	6630,000
2,2,3,3-tetrafluoropropan-1-ol	14,400
2,2,3,4,4,4-hexafluorobutan-1-ol	30,500
1,1,2,2-tetrafluoro-3-methoxypropane	1,680
1,1,1,2,2,4,5,5,5-nonafluoro-4-(trifluoromethyl)pentan-3-one	0,114
3,3,3-trifluoropropanal	0,025
2-fluoroethanol	0,530
2,2-difluoroethanol	6,180
2,2,2-trifluoroethanol	35,700
HG-04	4380,000
Methyl-perfluoroheptene-ethers	15,100
1,1,1-trifluoropropan-2-one	0,090
1,1,1-trifluorobutan-2-one	0,095
2-methylpentan-3-one	0,200
Ethyl methyl ether	0,010
Octafluorooxolane	13900,000
(z)-hex-2-en-1-ol	0,003
(e)-hex-2-en-1-ol	0,002
Hexamethyldisiloxane	0,476
Octamethyltrisiloxane	0,325
Decamethyltetrasiloxane	0,176
Dodecamethylpentasiloxane	0,122
Hexamethylcyclotrisiloxane	1,150
Octamethylcyclotetrasiloxane	0,739
Decamethylcyclopentasiloxane	0,289

CF-S SUS 1.1 Methodology for Product Carbon Footprint Calculation

Dodecamethylcyclohexasiloxane	0,142
Ethane	0,437
Propane	0,020
Butane	0,006