

Stoffliste BJ 2022

Stand: Oktober 2022

Bestimmte klimawirksame Stoffe und deren Blends

| Stoff         | STKZ <sup>1)</sup> | Chemische Bezeichnung / Handelsbezeichnung   | Summenformel  | CO <sub>2</sub> -Äquivalente <sup>2)</sup> |
|---------------|--------------------|--|---|--|
| <b>FKW</b>    |                    |  |   |  |
| R             | 14                 | Tetrafluormethan   | CF <sub>4</sub>   | 6 630                                      |
| R             | 116                | Hexafluorethan   | C <sub>2</sub> F <sub>6</sub>   | 11 100                                     |
| R             | c216               | Hexafluorocyclopropan  | c-C <sub>3</sub> F <sub>6</sub>   | 9 200                                      |
| R             | 218                | Okttafluoropropan  | C <sub>3</sub> F <sub>8</sub>   | 8 900                                      |
| R             | c318               | Octafluorocyclobutan   | c-C <sub>4</sub> F <sub>8</sub>   | 9 540                                      |
| R             | 3-1-10             | Decafluorbutan   | C <sub>4</sub> F <sub>10</sub>  | 9 200                                      |
| R             | 4-1-12             | Dodecafluorpentan  | C <sub>5</sub> F <sub>12</sub>  | 8 550                                      |
| R             | 5-1-14             | Tetradecafluorhexan  | C <sub>6</sub> F <sub>14</sub>  | 7 910                                      |
| R             | 9-1-18             | Perfluordecalin  | C <sub>10</sub> F <sub>18</sub>   | 7 190                                      |
| R             | 1316               | Hexafluor-1,3-butadien   | CF <sub>2</sub> =CF-CF=CF <sub>2</sub>  | 1  |
| <b>H-FKW</b>  |                    |  |   |  |
| R             | 23                 | Trifluormethan   | CHF <sub>3</sub>  | 12 400                                     |
| R             | 32                 | Difluormethan  | CH <sub>2</sub> F <sub>2</sub>  | 677  |
| R             | 41                 | Fluormethan  | CHF <sub>3</sub>  | 116  |
| R             | 125                | Pentafluorethan  | CHF <sub>2</sub> -CF <sub>3</sub>   | 3 170                                      |
| R             | 134                | 1,1,2,2-Tetrafluorethan  | CHF <sub>2</sub> -CHF <sub>2</sub>  | 1 120                                      |
| R             | 134a               | 1,1,1,2-Tetrafluorethan  | CF <sub>3</sub> -CH <sub>2</sub> F  | 1 300                                      |
| R             | 143                | 1,1,2-Trifluorethan  | CHF <sub>2</sub> -CHF <sub>2</sub> F  | 328  |
| R             | 143a               | 1,1,1-Trifluorethan  | CH <sub>3</sub> -CF <sub>3</sub>  | 4 800                                      |
| R             | 152                | 1,2-Difluorethan   | CH <sub>2</sub> F-CH <sub>2</sub> F   | 16   |
| R             | 152a               | 1,1-Difluorethan   | CH <sub>3</sub> -CHF <sub>2</sub>   | 138  |
| R             | 161                | Fluorethan   | CH <sub>3</sub> -CH <sub>2</sub> F  | 4  |
| R             | 227ea              | 1,1,1,2,3,3,3-Heptafluoropropan  | CF <sub>3</sub> -CHF-CF <sub>3</sub>  | 3 350                                      |
| R             | 236cb              | 1,2,2,3,3,3-Hexafluoropropan   | CH <sub>2</sub> F-CF <sub>2</sub> -CF <sub>3</sub>  | 1 210                                      |
| R             | 236ea              | 1,1,2,3,3,3-Hexafluoropropan   | CHF <sub>2</sub> -CHF-CF <sub>3</sub>   | 1 330                                      |
| R             | 236fa              | 1,1,1,3,3,3-Hexafluoropropan   | CF <sub>3</sub> -CH <sub>2</sub> -CF <sub>3</sub>   | 8 060                                      |
| R             | 245ca              | 1,1,2,2,3-Pentafluoropropan  | CHF <sub>2</sub> -CF <sub>2</sub> -CH <sub>2</sub> F  | 716  |
| R             | 245fa              | 1,1,3,3,3-Pentafluoropropan, "Enovate"   | CHF <sub>2</sub> -CH <sub>2</sub> -CF <sub>3</sub>  | 858  |
| R             | 43-10mee           | 1,1,1,2,2,3,4,5,5,5-Decafluoropentan   | CF <sub>3</sub> -CF <sub>2</sub> -CHF-CHF-CF <sub>3</sub>   | 1 650                                      |
| R             | 365mfc             | 1,1,1,3,3-Pentafluorbutan  | CF <sub>3</sub> -CH <sub>2</sub> -CF <sub>2</sub> -CH <sub>3</sub>  | 804  |
| R             | 1234yf             | 2,3,3,3-Tetrafluorprop-1-en, "Opteon YF", Solstice L-13, "Opteon XL 10"  | CF <sub>3</sub> -CF=CH <sub>2</sub>   | 1  |
| R             | 1234ze (E)         | trans-1,3,3,3-Tetrafluorprop-1-en "HBA-1", "Solstice Gas BA", "Solstice ze"  | CF <sub>3</sub> -CH=CHF (E)   | 1  |
| R             | 1336mzz (Z)        | cis-1,1,1,4,4,4-Hexafluorbut-2-en "Formacel 1100", DR-2  | CF <sub>3</sub> -CH=CH-CF <sub>3</sub> (Z)  | 2  |
| <b>HFCKW</b>  |                    |  |   |  |
| R             | 1224yd (Z)         | cis-1-Chlor-2,3,3,3-Tetrafluorprop-1-en, "Amolea 1224yd", "Amolea™yd"  | CHCl=CF-CF <sub>3</sub> (Z)   | 1  |
| R             | 1233zd (E)         | trans-1-Chlor-3,3,3-Trifluorprop-1-en, "HBA 2", "Solstice LBA" "Solstice@zd"   | CHCl=CH-CF <sub>3</sub> (E)   | 1  |
| <b>Blends</b> |                    |  |   |  |
| R             | 404A               | Suva HP 62 (Suva 404A neu), Reclin 404 A, Forane FX 70 (Forane 404A neu), Meforex M 55, Solkane 404A, Isceon 404 A, Klea 404A                      | R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 44%<br>R 134a (CH <sub>2</sub> F-CF <sub>3</sub> ): 4%<br>R 143a (CH <sub>3</sub> -CF <sub>3</sub> ): 52%                 | 3 943                                      |
| R             | 423A               | Isceon 39TC  | R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 52,5%<br>R 227ea (CF <sub>3</sub> -CHF-CF <sub>3</sub> ): 47,5%  | 2 274                                      |
| R             | 419A               | Forane FX 90   | R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 77%<br>R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 19%<br>RE170 (CH <sub>3</sub> -O-CH <sub>3</sub> ): 4 %               | 2 688                                      |
| R             | 407A               | Klea 407A (Klea60), Isceon 407A, Suva 407A   | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 20%<br>R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 40%<br>R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 40%                    | 1 923                                      |
| R             | 407B               | Klea 407B (Klea 61)  | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 10%<br>R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 70%<br>R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 20%                    | 2 547                                      |
| R             | 407C               | Reclin 407 C, HX 3, Forane 407C, Suva AC 9000 (Suva 407C neu), Klea 407C (Klea 66), Meforex M 95, Isceon 407 C, DAIKIN R407C (früher Solkane 407C) | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 23%<br>R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 25%<br>R 134a (CH <sub>2</sub> F-CF <sub>3</sub> ): 52%                    | 1 624                                      |
| R             | 407D               | Klea 407D  | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 15%<br>R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 15%<br>R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 70%                    | 1 487                                      |
| R             | 407E               | Klea 407E  | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 25%<br>R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 15%<br>R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 60%                    | 1 425                                      |
| R             | 410A               | Genetron AZ 20, DAIKIN R410A (früher Solkane 410A), Reclin 410, Suva 410A, Suva 9100, Meforex M 98, Klea 410A, Forane 410A                         | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 50%<br>R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 50%  | 1 924                                      |
| R             | 407F               | Genetron Performax LT (Honeywell)  | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 30%<br>R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 30%<br>R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 40%                    | 1 674                                      |
| R             | 407G               | Klea 407G  | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 2,5%<br>R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 2,5%<br>R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 95%                  | 1 331                                      |
| R             | 407H               | Klea 407H, Creard R407H (Daikin)   | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 32,5%<br>R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 15%<br>R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 52,5%                | 1 378                                      |
| R             | 407I               |  | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 19,5%<br>R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 8,5%<br>R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 72%                 | 1 337                                      |
| R             | 410B               |  | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 45%<br>R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 55 %   | 2 048                                      |
| R             | 413A               | Isceon MO49  | R 134a (CH <sub>2</sub> F-CF <sub>3</sub> ): 88%<br>R 218 (CF <sub>3</sub> -CF <sub>2</sub> -CF <sub>3</sub> ): 9%<br>R 600a (CH(CH <sub>3</sub> )) <sub>2</sub> : 3% | 1 945                                      |

|   |             |      |  |   |        |
|---|-------------|------|--|---|--------|
| R | 507A        | 4022 | Suva 507, AZ 50, Solkane 507, Klea 507, Reclin 507, Forane 507, Meforex M 57, Isceon 507, Genetron® AZ-50® | R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 50%<br>R 143a (CH <sub>3</sub> -CF <sub>3</sub> ): 50%  | 3 985  |
| R | 460C        | 4023 |  | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 2,5%<br>R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 2,5%<br>R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 46%<br>R 1234ze (CHF=CH-CF <sub>3</sub> ): 49%   | 695    |
| R | 463A        | 4024 | Opteon XP41 (Chemours)   | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 36%<br>R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 30%<br>R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 14%<br>R 1234yf (CH <sub>2</sub> =CF-CF <sub>3</sub> ): 14%<br>R 744 (CO <sub>2</sub> ): 6%  | 1 377  |
| R | 508A        | 4025 | Klea 508A (R5R3)   | R 23 (CHF <sub>3</sub> ): 39%<br>R 116 (C <sub>2</sub> F <sub>6</sub> ): 61%  | 11 607 |
| R | 464A        | 4026 |  | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 27%<br>R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 27%<br>R 227ea (CF <sub>3</sub> -CHF-CF <sub>3</sub> ): 6%<br>R 1234ze (CHF=CH-CF <sub>3</sub> ): 40%  | 1 240  |
| R | 465A        | 4027 | ARM-25 (Arkema)  | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 21%<br>R 1234yf (CH <sub>2</sub> =CF-CF <sub>3</sub> ): 71,1%<br>R 290 (C <sub>3</sub> H <sub>8</sub> ): 7,9%   | 143    |
| R | 508B        | 4028 | Suva 95  | R 23 (CHF <sub>3</sub> ): 46%<br>R 116 (C <sub>2</sub> F <sub>6</sub> ): 54%  | 11 698 |
| R | 515B        | 4029 | Solstice N15 (Honeywell)   | R 227ea (CF <sub>3</sub> -CHF-CF <sub>3</sub> ): 8,9%<br>R 1234ze (CHF=CH-CF <sub>3</sub> ): 91,1%  | 299    |
| R | 511A        | 4032 |  | R 152a (CH <sub>3</sub> -CHF <sub>2</sub> ): 5%<br>R 290 (CH <sub>3</sub> -CH <sub>2</sub> -CH <sub>3</sub> ): 95%  | 10     |
| R | 512A        | 4033 |  | R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 5%<br>R 152a (CH <sub>3</sub> -CHF <sub>2</sub> ): 95%   | 196    |
| R | 424A        | 4035 |  | R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 50,5%<br>R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 47%<br>R 600 (CH <sub>3</sub> -CH <sub>2</sub> -CH <sub>2</sub> -CH <sub>3</sub> ): 1%<br>R 600a ((CH <sub>3</sub> ) <sub>2</sub> CH-CH <sub>3</sub> ): 0,9%<br>R 601a ((CH <sub>3</sub> ) <sub>2</sub> CH-CH <sub>2</sub> -CH <sub>3</sub> ): 0,6% | 2 212  |
| R | 426A        | 4036 |  | R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 5,1%<br>R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 93%<br>R 600 (CH <sub>3</sub> -CH <sub>2</sub> -CH <sub>2</sub> -CH <sub>3</sub> ): 1,3%<br>R 601a (CH <sub>3</sub> -CH(CH <sub>3</sub> )-CH <sub>2</sub> -CH <sub>3</sub> ): 0,6%   | 1 371  |
| R | 513A        | 4038 | Opteon XP10 (Chemours), R513A (Daikin Chemical)  | R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 44%<br>R 1234yf (CH <sub>2</sub> =CF-CF <sub>3</sub> ): 56%  | 573    |
| R | 427A        | 4040 | Forane FX100, (neu: Forane 427A)   | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 15%<br>R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 25%<br>R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 50%<br>R 143a (CH <sub>3</sub> -CF <sub>3</sub> ): 10%   | 2 024  |
| R | 437A        | 4041 | Isceon MO49Plus  | R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 19,5%<br>R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 78,5%<br>R 600 (CH <sub>3</sub> -CH <sub>2</sub> -CH <sub>2</sub> -CH <sub>3</sub> ): 1,4%<br>R 601 (CH <sub>3</sub> -CH <sub>2</sub> -CH <sub>2</sub> -CH <sub>2</sub> -CH <sub>3</sub> ): 0,6%  | 1 639  |
| R | 438A        | 4042 | Isceon MO99  | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 8,5%<br>R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 45%<br>R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 44,2%<br>R 600 (CH <sub>3</sub> -CH <sub>2</sub> -CH <sub>2</sub> -CH <sub>3</sub> ): 1,7%<br>R 601a (CH <sub>3</sub> CH(CH <sub>3</sub> )CH <sub>2</sub> CH <sub>3</sub> ): 0,6%                     | 2 059  |
| R | 422B        | 4043 | NU-22  | R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 55%<br>R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 42%<br>R 600a (CH(CH <sub>3</sub> )): 3%  | 2 290  |
| R | 428A        | 4044 | RS-52  | R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 77,5%<br>R 143a (CH <sub>3</sub> -CF <sub>3</sub> ): 20%<br>R 290 (CH <sub>3</sub> -CH <sub>2</sub> -CH <sub>3</sub> ): 0,6%<br>R 600a ((CH <sub>3</sub> ) <sub>2</sub> CH-CH <sub>3</sub> ): 1,9%  | 3 417  |
| R | 434A        | 4045 | RS-45  | R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 63,2%<br>R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 16%<br>R 143a (CH <sub>3</sub> -CF <sub>3</sub> ): 18%<br>R 600a (CH(CH <sub>3</sub> )): 2,8%   | 3 076  |
|   | Isceon MO89 | 4046 | Isceon MO89  | R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 86%<br>R 290 (H <sub>3</sub> C-CH <sub>2</sub> -CH <sub>3</sub> ): 5%<br>R 218 (C <sub>3</sub> F <sub>8</sub> ): 9%   | 3 527  |
| R | 417C        | 4047 |  | R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 19,5%<br>R 134a (CH <sub>2</sub> F-CF <sub>3</sub> ): 78,8%<br>R 600 (CH <sub>3</sub> -CH <sub>2</sub> -CH <sub>2</sub> -CH <sub>3</sub> ): 1,7%  | 1 643  |
| R | 419B        | 4048 |  | R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 48,5%<br>R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 48%<br>RE170 (CH <sub>3</sub> -O-CH <sub>3</sub> ): 3,5%  | 2 161  |
| R | 417A        | 4049 | Isceon MO59  | R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 46,6%<br>R 134a (CH <sub>2</sub> F-CF <sub>3</sub> ): 50%<br>R 600 (CH <sub>3</sub> -CH <sub>2</sub> -CH <sub>2</sub> -CH <sub>3</sub> ): 3,4%  | 2 127  |
| R | 417B        | 4050 | Solkane 22L (Solvay)   | R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 79%<br>R 134a (CH <sub>2</sub> F-CF <sub>3</sub> ): 18,3%<br>R 600 (CH <sub>3</sub> -CH <sub>2</sub> -CH <sub>2</sub> -CH <sub>3</sub> ): 2,7%  | 2 742  |
| R | 430A        | 4051 |  | R 152a (CH <sub>3</sub> -CHF <sub>2</sub> ): 76%<br>R 600a (CH(CH <sub>3</sub> )): 24%  | 106    |
| R | 431A        | 4052 |  | R 152a (CH <sub>3</sub> -CHF <sub>2</sub> ): 29%<br>R 290 (CH <sub>3</sub> -CH <sub>2</sub> -CH <sub>3</sub> ): 71%   | 42     |
| R | 435A        | 4053 |  | R 152a (CH <sub>3</sub> -CHF <sub>2</sub> ): 20%<br>R E170 (CH <sub>3</sub> -O-CH <sub>3</sub> ): 80%   | 28     |
| R | 439A        | 4054 |  | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 50%<br>R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 47%<br>R 600a (CH(CH <sub>3</sub> )): 3%   | 1 828  |
| R | 440A        | 4056 |  | R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 1,6%<br>R 152a (CH <sub>3</sub> -CHF <sub>2</sub> ): 97,8%<br>R 290 (CH <sub>3</sub> -CH <sub>2</sub> -CH <sub>3</sub> ): 0,6%   | 156    |

|   |                            |      |   |  |       |
|---|----------------------------|------|---|--|-------|
| R | 442A                       | 4057 | RS-50   | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 31%<br>R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 31%<br>R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 30%<br>R 152a (CH <sub>3</sub> -CHF <sub>2</sub> ): 3%<br>R 227ea (CF <sub>3</sub> -CHF-CF <sub>3</sub> ): 5% | 1 754 |
| R | 444A                       | 4059 | AC5 (Koura (Mexichem))  | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 12%<br>R 152a (CH <sub>3</sub> -CHF <sub>2</sub> ): 5%<br>R 1234ze E (CF <sub>3</sub> -CH=CHF): 83%  | 89    |
| R | 444B                       | 4060 | Solstice L-20   | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 41,5%<br>R 152a (CH <sub>3</sub> -CHF <sub>2</sub> ): 10%<br>R 1234ze E (CF <sub>3</sub> -CH=CHF): 48,5%   | 295   |
| R | 365 mfc/ R 227ea Gemisch 1 | 4062 | Solkane 365/227 93/7  | R 227ea (CF <sub>3</sub> -CHF-CF <sub>3</sub> ): 7%<br>R 365 mfc (CF <sub>3</sub> -CH <sub>2</sub> -CF <sub>2</sub> -CH <sub>3</sub> ): 93%  | 982   |
| R | 365 mfc/ R 227ea Gemisch 2 | 4063 | Solkane 365/227 87/13   | R 227ea (CF <sub>3</sub> -CHF-CF <sub>3</sub> ): 13%<br>R 365 mfc (CF <sub>3</sub> -CH <sub>2</sub> -CF <sub>2</sub> -CH <sub>3</sub> ): 87%   | 1 135 |
| R | 422A                       | 4066 | Isceon MO79   | R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 85,1%<br>R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 11,5%<br>R 600a (CH(CH <sub>3</sub> ) <sub>2</sub> ): 3,4%   | 2 847 |
| R | 422D                       | 4067 | Isceon MO29   | R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 65,1%<br>R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 31,5%<br>R 600a (CH(CH <sub>3</sub> ) <sub>2</sub> ): 3,4%   | 2 473 |
| R | 421A                       | 4068 |   | R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 58%<br>R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 42%  | 2 385 |
| R | 421B                       | 4069 |   | R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 85%<br>R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 15%  | 2 890 |
| R | 422C                       | 4071 |   | R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 82%<br>R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 15%<br>R 600a (CH(CH <sub>3</sub> ) <sub>2</sub> ): 3%   | 2 794 |
| R | 422E                       | 4072 |   | R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 58%<br>R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 39,3%<br>R 600a (CH(CH <sub>3</sub> ) <sub>2</sub> ): 2,7%   | 2 350 |
| R | 425A                       | 4073 |   | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 18,5%<br>R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 69,5%<br>R 227ea (CF <sub>3</sub> -CHF-CF <sub>3</sub> ): 12%  | 1 431 |
| R | 429A                       | 4074 |   | R 152a (CH <sub>3</sub> -CHF <sub>2</sub> ): 10%<br>R E170 (CH <sub>3</sub> -O-CH <sub>3</sub> ): 60%<br>R 600a (CH(CH <sub>3</sub> ) <sub>2</sub> ): 30%  | 15    |
| R | 445A                       | 4075 | Mexichem AC6  | R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 9%<br>R 1234ze E (CF <sub>3</sub> -CH=CHF): 85%<br>R 744 (CO <sub>2</sub> ): 6%   | 118   |
| R | 446A                       | 4076 |   | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 68%<br>R 1234ze (CHF=CH-CF <sub>3</sub> ): 29%<br>R 600 (CH <sub>2</sub> -CH <sub>2</sub> -CH <sub>2</sub> -CH <sub>3</sub> ): 3%  | 461   |
| R | 447A                       | 4077 | Solstice L-41 (Honeywell)   | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 68%<br>R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 3,5%<br>R 1234ze (CHF=CH-CF <sub>3</sub> ): 28,5%   | 572   |
| R | 448A                       | 4078 | Solstice N40 (Honeywell)  | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 26%<br>R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 26%<br>R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 21%<br>R 1234yf (CH <sub>2</sub> =CF-CF <sub>3</sub> ): 20%<br>R 1234ze E (CF <sub>3</sub> -CH=CHF): 7%       | 1 273 |
| R | 449A                       | 4079 | Opteon XP40 (Chemours), Forane 449 (Arkema)                                 | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 24,3%<br>R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 24,7%<br>R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 25,7%<br>R 1234yf (CH <sub>2</sub> =CF-CF <sub>3</sub> ): 25,3%   | 1 282 |
| R | 450A                       | 4080 | Solstice N13 (Honeywell)  | R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 42%<br>R 1234ze (CHF=CH-CF <sub>3</sub> ): 58%  | 547   |
| R | 451A                       | 4081 |   | R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 10,2%<br>R 1234yf (CH <sub>2</sub> =CF-CF <sub>3</sub> ): 89,8%   | 133   |
| R | 451B                       | 4082 |   | R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 11,2%<br>R 1234yf (CH <sub>2</sub> =CF-CF <sub>3</sub> ): 88,8%   | 146   |
| R | 452A                       | 4083 | Opteon XP44 (Chemours)  | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 11%<br>R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 59%<br>R 1234yf (CH <sub>2</sub> =CF-CF <sub>3</sub> ): 30%   | 1 945 |
| R | 454A                       | 4084 | Opteon XL40 (früher DR-7, Chemours), R454A (Daikin Chemical, früher D2Y-65) | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 35%<br>R 1234yf (CH <sub>2</sub> =CF-CF <sub>3</sub> ): 65%  | 238   |
| R | 454B                       | 4085 | Opteon XL41 (früher DR-5A, Chemours), Puron Advance (Carrier)               | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 68,9%<br>R 1234yf (CH <sub>2</sub> =CF-CF <sub>3</sub> ): 31,1%  | 467   |
| R | 452B                       | 4086 | Opteon XL55 (Chemours), Solstice L-41y (Honeywell)                          | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 67%<br>R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 7%<br>R 1234yf (CH <sub>2</sub> =CF-CF <sub>3</sub> ): 26%  | 676   |
| R | 454C                       | 4087 | Opteon XL20 (Chemours)  | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 21,5%<br>R 1234yf (CH <sub>2</sub> =CF-CF <sub>3</sub> ): 78,5%  | 146   |
| R | 455A                       | 4088 | Solstice L40X (früher HDR110) (Honeywell)                                   | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 21,5%<br>R 1234yf (CH <sub>2</sub> =CF-CF <sub>3</sub> ): 75,5%<br>R 744 (CO <sub>2</sub> ): 3%  | 146   |
| R | 447B                       | 4089 | Solstice L-41z (Honeywell)  | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 68%<br>R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 8,0%<br>R 1234ze (CHF=CH-CF <sub>3</sub> ): 24,0%   | 714   |
| R | 456A                       | 4090 | ACSX (Koura/Mexichem)   | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 6%<br>R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): : 45%<br>R 1234ze (CHF=CH-CF <sub>3</sub> ): 49%  | 626   |
| R | 457A                       | 4091 | ARM-20a (Arkema)  | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 18%<br>R 152a (CH <sub>3</sub> -CHF <sub>2</sub> ): 12%<br>R 1234yf (CH <sub>2</sub> =CF-CF <sub>3</sub> ): 70%  | 139   |
| R | 459A                       | 4092 | ARM-71 (Arkema)   | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 68%<br>R 1234yf (CH <sub>2</sub> =CF-CF <sub>3</sub> ): 26%<br>R 1234ze E (CF <sub>3</sub> -CH=CHF): 6%  | 461   |
| R | 459B                       | 4093 | LTR11 (Mexichem)  | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 21%<br>R 1234yf (CH <sub>2</sub> =CF-CF <sub>3</sub> ): 69%<br>R 1234ze E (CF <sub>3</sub> -CH=CHF): 10%   | 143   |

|   |      |      |   |  |       |
|---|------|------|---|--|-------|
| R | 460A | 4094 | LTR10 (Mexichem)                        | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 12%<br>R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 52%<br>R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 14%<br>R 1234ze (CHF=CH-CF <sub>3</sub> ): 22%  | 1 912 |
| R | 460B | 4095 | LTR4X (Mexichem)                        | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 28%<br>R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 25%<br>R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 20%<br>R 1234ze (CHF=CH-CF <sub>3</sub> ): 27%  | 1 242 |
| R | 466A | 4096 | Solstice N-41 (Honeywell)               | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 49%<br>R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 11,5%<br>R 131i (CF <sub>3</sub> ): 39,5%   | 696   |
| R | 513B | 4097 |   | R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 41,5%<br>R 1234yf (CH <sub>2</sub> =CF-CF <sub>3</sub> ): 58,5%   | 540   |
| R | 514A | 4098 | Opteon XP30 (DuPont)                    | R 1336mzz (CF <sub>3</sub> -CH=CH-CF <sub>3</sub> ): 74,7%<br>R 1130 (CHCl=CHCl): 25,3%  | 2     |
| R | 515A | 4099 | HDR-115                                 | R 227ea (CF <sub>3</sub> -CHF-CF <sub>3</sub> ): 12%<br>R 1234ze (CHF=CH-CF <sub>3</sub> ): 88%  | 403   |
| R | 449B | 4101 |   | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 25,2%<br>R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 24,3%<br>R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 27,3%<br>R 1234yf (CH <sub>2</sub> =CF-CF <sub>3</sub> ): 23,2%   | 1 296 |
| R | 449C | 4102 | Opteon XP20 (Chemours)                  | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 20%<br>R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 20%<br>R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 29%<br>R 1234yf (CH <sub>2</sub> =CF-CF <sub>3</sub> ): 31%   | 1 147 |
| R | 467A | 4103 |   | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 22%<br>R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 5%<br>R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 72,4%<br>R 600a (CH(CH <sub>3</sub> )): 0,6%   | 1 249 |
| R | 468A | 4104 | Daikin Chemical                         | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 21,5%<br>R 1234yf (CH <sub>2</sub> =CF-CF <sub>3</sub> ): 75%<br>R 1132a (CH <sub>2</sub> =CF <sub>2</sub> ): 3,5%   | 146   |
| R | 469A | 4105 |   | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 32,5%<br>R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 32,5%<br>R 744 (CO <sub>2</sub> ): 35%  | 1 251 |
| R | 470A | 4106 | RS-53                                   | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 17%<br>R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 19%<br>R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 7%<br>R 227ea (CF <sub>3</sub> -CHF-CF <sub>3</sub> ): 3%<br>R 1234ze (CHF=CH-CF <sub>3</sub> ): 44%<br>R 744 (CO <sub>2</sub> ): 10%     | 909   |
| R | 470B | 4107 | RS-51 (Refrigerant Solutions Ltd (RSL)) | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 11,5%<br>R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 11,5%<br>R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 3%<br>R 227ea (CF <sub>3</sub> -CHF-CF <sub>3</sub> ): 7%<br>R 1234ze (CHF=CH-CF <sub>3</sub> ): 57%<br>R 744 (CO <sub>2</sub> ): 10% | 717   |
| R | 457B | 4108 | ARM-20b (Arkema)                        | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 35%<br>R 152a (CH <sub>3</sub> -CHF <sub>2</sub> ): 10%<br>R 1234yf (CH <sub>2</sub> =CF-CF <sub>3</sub> ): 55%  | 251   |
| R | 471A | 4109 | Honeywell                               | R 227ea (CF <sub>3</sub> -CHF-CF <sub>3</sub> ): 4,3%<br>R 1234ze (E) (CHF=CH-CF <sub>3</sub> ): 78,7%<br>R 1336mzz (E) (CHF <sub>2</sub> -CF <sub>3</sub> ): 17,0%  | 145   |
| R | 472A | 4110 |   | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 12%<br>R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 19%<br>R 744 (CO <sub>2</sub> ): 69%   | 329   |
| R | 516A | 4111 | ARM-42 (Arkema)                         | R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 8,5%<br>R 152a (CH <sub>3</sub> -CHF <sub>2</sub> ): 14%<br>R 1234yf (CH <sub>2</sub> =CF-CF <sub>3</sub> ): 77,5%  | 131   |
| R | 427C | 4112 |   | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 25%<br>R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 25%<br>R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 40%<br>R 143a (CH <sub>3</sub> -CF <sub>3</sub> ): 10%  | 1 962 |
| R | 448B | 4113 |   | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 21%<br>R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 21%<br>R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 31%<br>R 1234yf (CH <sub>2</sub> =CF-CF <sub>3</sub> ): 20%<br>R 1234ze (E) (CF <sub>3</sub> -CH=CHF): 7%                                 | 1 211 |
| R | 468B | 4114 |   | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 13%<br>R 1234yf (CH <sub>2</sub> =CF-CF <sub>3</sub> ): 81%<br>R 1132a (CH <sub>2</sub> =CF <sub>2</sub> ): 6%   | 89    |
| R | 468C | 4115 |   | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 42%<br>R 1234yf (CH <sub>2</sub> =CF-CF <sub>3</sub> ): 52%<br>R 1132a (CH <sub>2</sub> =CF <sub>2</sub> ): 6%   | 285   |
| R | 472B | 4116 |   | R 32 (CH <sub>2</sub> F <sub>2</sub> ): 10%<br>R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 32%<br>R 744 (CO <sub>2</sub> ): 58%   | 484   |
| R | 473A | 4117 | Klea 473A                               | R 23 (CHF <sub>3</sub> ): 10%<br>R 125 (CHF <sub>2</sub> -CF <sub>3</sub> ): 10%<br>R 1132a (CH <sub>2</sub> =CF <sub>2</sub> ): 20%<br>R 744 (CO <sub>2</sub> ): 60%  | 1 558 |
| R | 475A | 4118 |   | R 134a (CF <sub>3</sub> -CH <sub>2</sub> F): 43%<br>R 1234yf (CH <sub>2</sub> =CF-CF <sub>3</sub> ): 45%<br>R 1234ze (E) (CF <sub>3</sub> -CH=CHF): 12%  | 560   |

CO<sub>2</sub> - Äquivalente-Faktor: Treibhauspotenzial eines Stoffes entsprechend der gleichen Menge (Masse) CO<sub>2</sub> Kohlenstoffdioxid CO<sub>2</sub> - Äquivalente -Faktor = 1

<sup>1)</sup> STKZ -Stoffkennziffer

<sup>2)</sup> GWP-Faktor nach IPCC 2013: verbindlich gültig ab 2021 für die Berichterstattung nach Paris Agreement (Quelle: IPCC 5th Assessment Report, Climate Change