

## Fluorinated Gases Data - 2015 to 2020

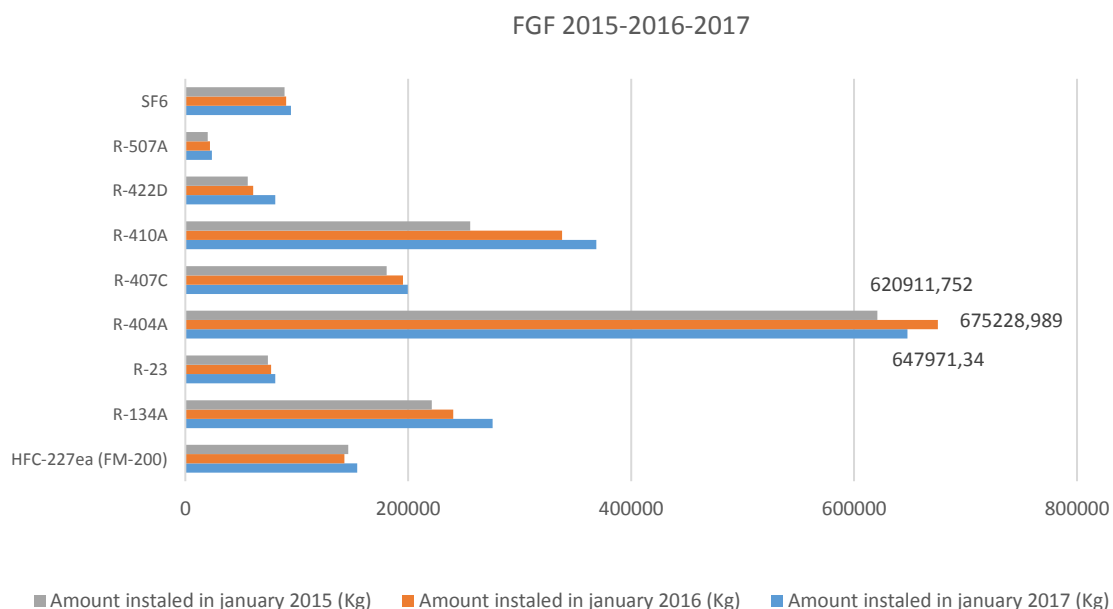
The operators whose equipment contains 5 or more tonnes of CO<sub>2</sub> equivalent have to communicate their 2015 to 2020 F-Gas data through specific forms (the communication took place between 2016 and 2021).

The data related to the number of operators, entities and communicated forms, from 2015 to 2020, are the following:

Year	Nº Communicated forms
2015	9063
2016	9326
2017	9618
2018	10017
2019	10885
2020	11432

In order to smooth and to make the assessment clearer the data of the most used fluorinated gases used in PT is divided into two different periods: 2015-2017 and 2018-2020.

The evolution regarding the amount of the most used fluids (in kg) installed in equipment from 2015 to 2017 is presented in the figure below.



**Graphic 1** - Values of the quantities of fluorinated gases installed in equipment from 2015 to 2017.

**Table 1** - F-Gas installed in PT equipment's between 2015 and 2017.

Fluids	GWP	Amount installed in January 2017 (kg)	Amount installed in January 2016 (kg)	Amount installed in January 2015 (kg)	$\Delta_{2016,2017}$	$\Delta\%$	$\Delta_{2015,2016}$	$\Delta\%$
HFC-227ea (FM-200)	3 220	154 272	142 710	1 461	11 562	7,5%	-3 428	-2,4%
R-134 A	1 430	275 742	240 398	221 023	35 344	12,8%	19 375	8,8%
R-23	14 800	80 670	77 019	74 155	3 650	4,5%	2 864	3,9%
R-404 A	3 921	647 971	675 229	620 912	-27 258	-4,2%	54 317	8,8%
R-407C	1 774	199 574	195 229	180 771	4 344	2,2%	14 458	8,0%
R-410 A	2 088	368 620	337 966	255 734	30 654	8,3%	82 232	32,1%
R-422D	2 729	80 694	60 945	55 698	19 749	24,5%	5 048	9,0%
R-507 A	3 985	23 714	22 087	20 044	1 626	6,9%	2 043	10,2%
SF6	22 800	94 812	90 573	89 036	4 239	4,5%	1 537	1,7%
<b>Total</b>	-	<b>2 015 403</b>	<b>1 860 577</b>	<b>1 601 597</b>	154 826	7,7%	258 979	16,2%

The communication concerning the total amount of fluid installed in 2015 was 1 601 597 Kg, increasing in the following years (2016 and 2017) to 1 860 577 Kg and 2 015 403 Kg, respectively.

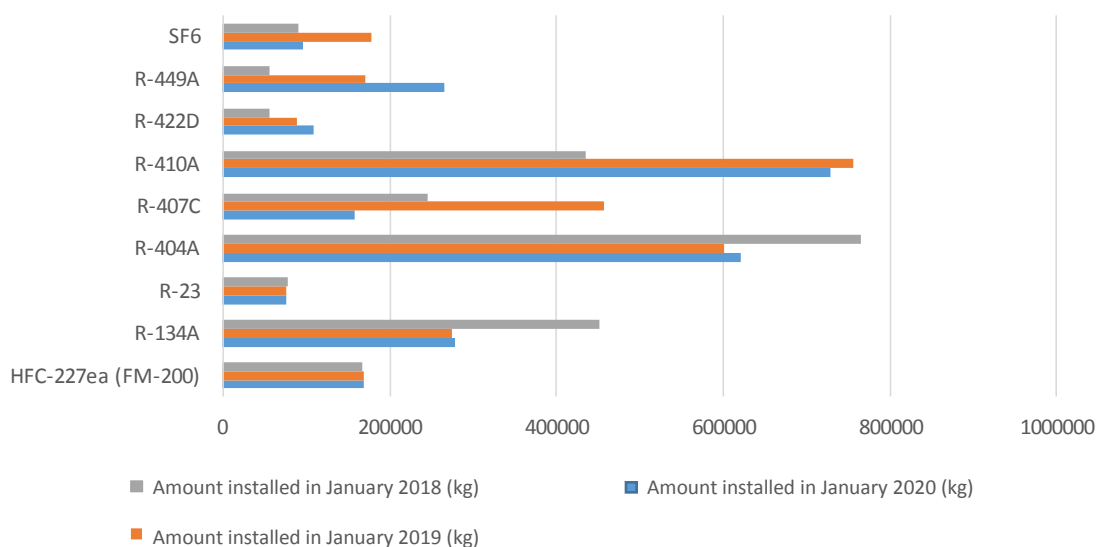
The amount installed in equipment, in the majority of fluids, increased in 2015 and 2016, since the number of entities registered and the number of machines containing F-Gas increased as well.

Concerning the F-Gas data from 2016 to 2017, it was found a reversal in the upward trend of the amount of the R-404A fluid installed. The installation of this fluid, which has a very high PAG (3921) decreased 4,2%.

R-404A is the fluid installed in the majority of equipment in PT and it has been registered a concerning growth trend over the years. Although, in 2017 it was found a decrease in the amount of R-404A installed, which is apparently positive. More years will be needed to verify if there is a consolidated decreasing trend though.

The evolution regarding the amount of the most used fluids installed in equipment from 2018 to 2020 was the following:

FGF 2018-2019-2020



**Graphic 2** - Values of the quantities of fluorinated gases installed in equipment from 2018 to 2020.

**Table 2** - F-Gas installed in PT equipment's between 2018 and 2020.

Fluids	GWP	Amount installed in January 2020 (kg)	Amount installed in January 2019 (kg)	Amount installed in January 2018 (kg)	$\Delta_{2019\_2020}$	$\Delta\%$	$\Delta_{2018\_2019}$	$\Delta\%$
HFC-227ea (FM-200)	3 220	168 545	168 481	166 885	64	0,0%	1 596	1,0%
R-134A	1 430	278 949	275 247	452 020	3 702	1,3%	-176 773	-39,1%
R-23	14 800	75 580	75 766	76 937	-186	-0,3%	-1 171	-1,5%
R-404A	3 921	620 944	601 014	764 935	19 929	3,2%	-163 921	-21,4%
R-407C	1 774	157 893	457 470	245 031	-299 577	-189,7%	212 439	86,7%
R-410A	2 088	727 823	756 928	434 343	-29 104	-4,0%	322 585	74,3%
R-422D	2 729	108 851	88 756	55 059	10 095	18,5%	33 697	59,7%
R-449A	1 397	266 235	170 233	55 059	96 002	36,1%	115 174	109,2%
SF6	22 800	96 864	177 282	90 276	-80 418	-83,0%	87 006	96,4%
<b>Total</b>	-	<b>2 672 536</b>	<b>2 945 479</b>	<b>2 494 697</b>	<b>-272 944</b>	<b>-10,2%</b>	<b>450 782</b>	<b>18,1%</b>

In 2018 the amount of fluids installed was 2 494 697 kg according to the data communicated, this value increased in 2019 to 2 945 479 kg, in 2020 the amount of fluids installed decreased to 2 672 536 kg.

The amount installed in equipment, in the majority of fluids, increased between 2018 and 2020, since the number of entities registered and the number of machines containing F-Gas increased as well.



Concerning the data from 2018 to 2019, there was a significant decrease in the amount of R404A fluid installed, as it was registered, from 2019 to 2020, a significant decrease in the amount of the R407C fluid installed.

The restrictions established by F-Gas Regulation may explain the use reduction of the R404A and R407C fluids, which have a higher PAG. On the other side, they may also explain the increase in the use of R449A fluid, which is used as a substitute of R404A and R407C since it has a lower PAG (1397).