



**END  
OF LIFE**  
NON-STICK  
COATING

The term PFAS is a generic name that encompasses thousands of very different substances. While some are unquestionably recognized as harmful, it is sometimes broadly defined to unnecessarily include some targeted chemicals approved for use by regulatory authorities. This is particularly the case with non-stick coatings (PTFE).

Since the 1970s, public health authorities around the world have taken a unanimous position on PTFE: it is inert, non-bioaccumulative, not water soluble, and therefore safe for consumers. As recently as January 2025, FDA stated the use of non-stick coatings is approved for food contact applications.

In the same time, public authorities and studies show that the end-of-life of kitchen utensils with a PTFE coating do not represent a major challenge for the environment or human health.

## DESTINATION OF END-OF-LIFE PANS

**2024 - 66% of consumers say they dispose of their used cookware in recycling channels, and 19% says they dispose them incorrectly**

In a consumer study launched by Groupe SEB in 2024, two-thirds of consumers say they prefer channels that allow the recycling of kitchen utensils (waste disposal centre, domestic recycling, in-store deposit).




















This proportion is 47% in the USA, and rises to 73% in France or 80% in Sweden. In other cases, kitchen utensils are thrown away with household waste.

In the United States, 47% of kitchen utensils are recycled; This lower number can be explained in particular by a higher level of donations than in the rest of the surveyed countries (15%).



## Global view of last disposal method for worn out pan

Over the 12 countries surveyed, similar results are seen for the last disposal method. Except in China where it is the top method, going to a store to recycle a worn-out pan is not common.

	Total	 France	 Germany	 Italy	 Netherlands	 Denmark	 Norway	 Sweden	 Poland	 Czech Republic	 Hungary	 USA	 China
Basis	3249	273	257	328	252	263	256	260	299	261	248	281	271
I took it to a waste disposal center	 36%	36%	33%	42%	25%	57%	42%	59%	22%	46%	30%	9%	13%
I threw it in the recyclable household waste	 20%	22%	15%	13%	19%	16%	14%	16%	33%	16%	22%	16%	31%
I threw it in the non-recyclable household waste	 19%	13%	30%	23%	31%	7%	19%	10%	28%	15%	20%	26%	7%
I took it to my usual store which organizes a collection and a recycling operation	 11%	14%	8%	10%	14%	7%	15%	6%	6%	5%	6%	11%	31%
I kept it at home	 8%	5%	9%	8%	6%	5%	6%	6%	6%	11%	12%	11%	12%
I donated it to an association	 5%	8%	5%	4%	1%	3%	4%	2%	4%	5%	4%	15%	6%
Other	 2%	2%	0%	1%	4%	4%	1%	1%	1%	3%	5%	1%	0%
Incineration / Landfill	19%	13%	30%	23%	31%	7%	19%	10%	28%	15%	20%	26%	7%
Recycling	66%	73%	56%	64%	58%	80%	71%	82%	61%	67%	58%	47%	75%



P2BIS: And what did you do with your last worn-out pan?

X% Top 3 last disposal methods in the country

XY/XX Significant differences vs total 12 countries at 95%



# CURRENT SOLUTIONS FOR END-OF-LIFE MANAGEMENT OF COATED ARTICLES ARE CONSIDERED SATISFACTORY

## PTFE IS COMPATIBLE WITH LANDFILLING

### 2024 - EPA confirms fluoropolymers are waste compatible with all types of landfills

In a guidance document regarding the destruction of PFAS, the Environmental Protection Agency (EPA) highlights the specificity of fluoropolymers such as PTFE and their compatibility with landfills, including municipal landfills.



*Landfill disposal in all landfill types: Landfill disposal of stable polymeric PFAS. Stable polymeric PFAS, such as polytetrafluoroethylene (Teflon™) and fluorinated ethylene propylene (FEP), are large molecules that are not susceptible to hydrolysis or oxidation. They are neither volatile nor water soluble and, as a result, they are expected to remain within the waste mass for long periods of time. This PFAS category tends not to migrate with the leachate and is unlikely to volatilize with the LFG; therefore, permitted hazardous and municipal solid waste (MSW) landfills (MSWLFs) may provide a good disposal option.*



Environmental Protection Agency, [Interim Guidance on the Destruction and Disposal of Perfluoroalkyl and Polyfluoroalkyl Substances and Materials Containing Perfluoroalkyl and Polyfluoroalkyl Substances](#) - April 2024

### 2023 - ITRC considers fluoropolymers to have no impact on the environment

In a 2024 report, the Interstate Technology Regulatory Council recognizes that fluoropolymers (including PTFE) are stable, insoluble and do not degrade and therefore have no impact on the environment.





*[...] a stable, insoluble fluoropolymer such as PTFE may pose little environmental/ecological or health risk once it is in a product.*



Interstate Technology Regulatory Council, [Per and poly-fluoroalkyl substances](#), September 2023

## 2021 - The Dutch National Institute for Public Health and the Environment (RIVM) confirms that in view of its characteristics, a PTFE coated article in landfill would not decompose



By confirming the stability and non-degradation temperatures of PTFE, the RIVM indicated that it will not degrade in the event of long-term burial.

 According to this study, **PTFE can be used for a long time at 260 °C** and for a short time up to a temperature of 450 °C without loss of mass due to the formation of fluorine-containing gases. 

Rijksinstituut voor Volksgezondheid en Milieu, Per- and polyfluorinated substances in waste incinerator flue gases, December 2021

## 2021 - Study confirms fluoropolymers do not degrade if landfilled

This study highlights that due to multiple factors, fluoropolymers such as PTFE do not degrade in the environment when buried. In addition, they have good UV resistance.



 [...] fluoropolymers are highly unlikely to degrade in landfill conditions. They have high UV resistance, are not subject to degradation by microbiological activity, and fluoropolymer decomposition temperatures are not reached in landfills. Their inertness to chemicals and insolubility in water and other solvents adds to their stability in landfills. 

ColePalmer, UV Properties of Plastics: Transmission and Resistance, March 2021

## INCINERATION IS AN ACCEPTABLE SOLUTION FOR THE END OF LIFE OF PFAS

### 2024 - EPA considers that incineration, especially in hazardous waste incinerators, may be a good option for destroying PFAS



In its 2024 guidance document, the Environmental Protection Agency states that while landfilling is a satisfactory pathway for managing PFAS at the end of life, incineration could be an even better option.

 Hazardous waste combustors (HWCs), [...] may be more effective at adequately destroying (mineralizing) PFAS. 

Environmental Protection Agency, Interim Guidance on the Destruction and Disposal of Perfluoroalkyl and Polyfluoroalkyl Substances and Materials Containing Perfluoroalkyl and Polyfluoroalkyl Substances-April 2024

## 2021 - RIVM reaffirms that PTFE is completely thermally degraded at combustion at 850°C



In this study, the Rijksinstituut voor Volksgezondheid en Milieu confirms that at 800°C, the temperature corresponding to EU municipal incinerators at the lowest temperatures, PTFE is completely destroyed.

 *For PTFE it can be concluded that complete thermal decomposition is achieved at a temperature of about 800°C.* 

Rijksinstituut voor Volksgezondheid en Milieu, Per- and polyfluorinated substances in waste incinerator flue gases, December 2021

## 2019 - KIT study confirms that Municipal incineration of PTFE using best available technologies (BAT) should be considered an acceptable form of waste treatment



Karlsruher Institut für Technologie (KIT) study confirms, via field tests, that the incineration of PTFE at 1100°C is a suitable solution for the treatment of waste containing it.

 *Therefore, municipal incineration of PTFE using best available technologies (BAT) is not a significant source of the studied PFAS and should be considered an acceptable form of waste treatment.* 

Karlsruher Institut für Technologie, Waste incineration of Polytetrafluoroethylene (PTFE) to evaluate potential formation of per- and Poly-Fluorinated Alkyl Substances (PFAS) in flue gas, April 2019

## 2024 - KIT STUDY provides strong evidence that fluoropolymers, including PTFE, can be effectively mineralized through high-temperature incineration at 1100°C and even at 850°C

This study, focused on municipal incinerators to European standards (i.e. 850°C), underlines that these temperatures are satisfactory for the disposal of fluoropolymers. This is therefore also true for incinerators operating at higher temperatures, as in the United States.

 *Statistical analysis of the results confirmed non-detect to negligible levels of PFAS evidencing mineralization of fluoropolymers. There was no discernible effect of temperature on the mineralization of fluoropolymer and testing at 860°C versus 1095°C did not show evidence of an increase in PFAS emissions.* 

Karlsruher Institut für Technologie, Mineralization of fluoropolymers from combustion in a pilot plant under representative european municipal and hazardous waste combustor conditions, September 2024

## 2021 - Survey results show that typical municipal waste-to-energy combustion operating conditions in the U.S. are furnace temperature above 1160°C

In this study, researchers from the University of Delaware indicate that while industry standards recommend a temperature of 850°C for municipal incinerators, incinerators in the United States typically operate above 1160°C.



*Survey results show that typical municipal waste-to-energy combustion operating conditions in the U.S. are furnace temperature above 1160°C, gas residence time above 2.4 s [...].*



Giraud et al, Combustion operating conditions for municipal Waste-to-Energy facilities in the U.S., July 2021

## RECYCLING OF ALUMINUM MEETS THE STANDARDS OF INCINERATION AND REDUCE ENVIRONMENTAL IMPACT

Recycling processes for aluminum, contained for example in non-stick pans, coupled with post-treatment solutions at high temperatures, make it possible to completely degrade fluoropolymers such as PTFE, consistent with the studies observed concerning incineration.

This solution also considerably reduces the carbon footprint of the kitchenware industry. Indeed, the use of recycled aluminum reduces the carbon footprint by 95% compared to primary aluminum.

## CONCLUSION

In view of the current use of the pots and pans, as well as the requirements of the competent authorities and the state of the scientific literature, the end-of-life of PTFE used in the non-stick coating does not pose an environmental or human health problem.

Current pathways to manage the end-of-life of coated articles are appropriate and effective in preserving human health and the environment. The question of the end-of-life of fluoropolymers such as PTFE is, therefore, not a criterion for restricting their use in consumer, professional and industrial applications, including in contact with food.

