



Europe Economics

Socio-Economic Assessment for the European Fluoropolymers Industry

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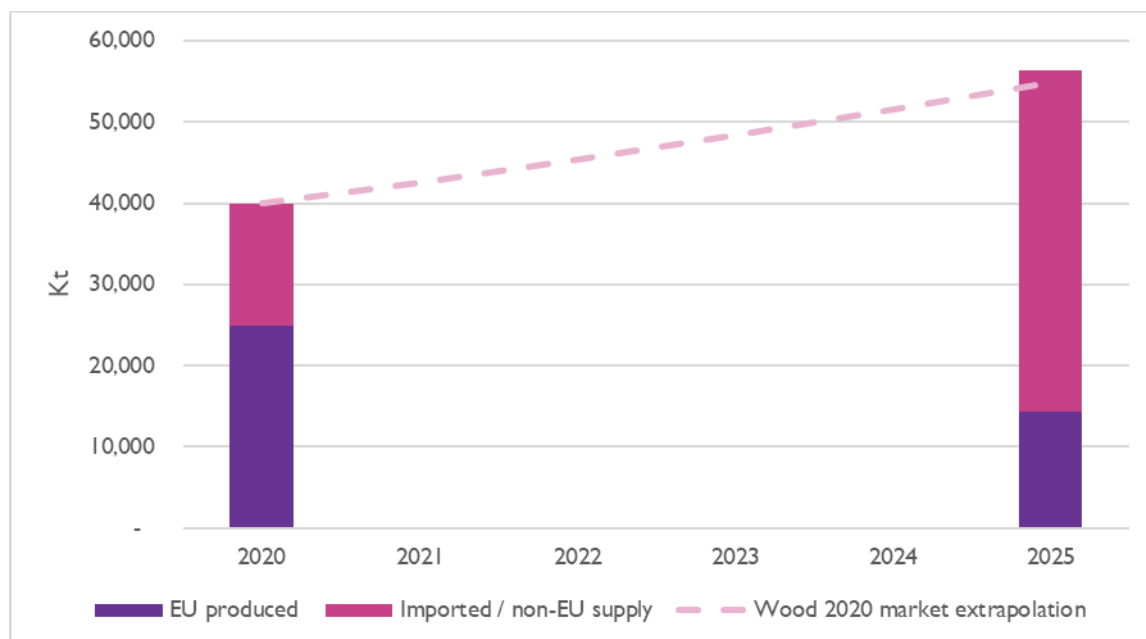
Executive summary

Fluoropolymers are small-volume, high-performance materials that play enabling roles across strategically important EU value chains. They are used in applications where chemical resistance, thermal stability, durability, electrical performance and reliability are critical, including defence, transport, clean energy technologies, semiconductors, electronics, sealings, lubricants, medical and pharmaceutical-related applications and wider industrial uses.

This report assesses the socio-economic importance of fluoropolymers from two complementary perspectives. First, it estimates the economic footprint of fluoropolymer manufacturing within the EU27. Second, it assesses the scale of downstream economic activity that may be exposed where fluoropolymers perform enabling functions and substitution is difficult or not viable in the short run.

EU27 fluoropolymer demand is materially larger than EU27 domestic supply. The report estimates the EU27 fluoropolymer market at approximately 56,500 tonnes in 2025. Domestic manufacturers produced approximately 29,500 tonnes of fluoropolymers in the EU27 and exported approximately 15,000 tonnes, implying that around 14,500 tonnes of EU27-produced fluoropolymers were supplied to the EU27 market. Comtrade data indicate imports of approximately 42,000 tonnes, indicating EU27 production accounts for approximately one quarter of EU27 fluoropolymer market supply, with imports or non-EU supply accounting for approximately three quarters. Previous estimates indicate that imports accounted for around 38 per cent of fluoropolymers sold in the EU28/EEA in 2020, suggesting that over the last five years import dependence has increased substantially.

Figure 0.1: Indicative change in European fluoropolymer market supply structure, 2020–2025



2020 figures are based on Wood’s estimate of fluoropolymers sold in the EU28/EEA, split between EU-produced supply and imports. The 2025 figures are based on the central market estimate used in this report and producer data collected for this study. The dotted line shows an extrapolation of Wood’s 2020 market estimate using the annual growth assumption referenced in the Wood analysis; it is included as an indicative trend rather than an observed market series.

Table 0.1: Estimated EU27 fluoropolymer market size and structure, 2025

Quantities (tonnes)	EU27
Tonnes produced in the EU27	29,500
Tonnes imported into the EU27	42,000
Tonnes exported from the EU27	15,000
EU27-produced supply sold in the EU27	14,500
Tonnes sold in the EU27	56,500
Implied share of EU sales supplied by EU	25%
Implied share of EU sales supplied by non-EU	75%

Figures are rounded to the nearest 500 tonnes. Shares are calculated using unrounded figures where available and rounded to the nearest whole percentage point. Comtrade imports refer to EU imports reported under HS 390461 and HS 390469 in 2025. HS 390461 covers polytetrafluoroethylene in primary forms, while HS 390469 covers other fluoropolymers in primary forms.

EU fluoropolymer manufacturing supports wider EU economic activity. EU27 fluoropolymer manufacturing directly supports approximately **€620 million of output, €150 million of GVA** and **2,800 FTE jobs**. Once indirect and induced effects are included, the estimated economy-wide footprint rises to approximately **€1.6 billion of output, €550 million of GVA** and **14,500 FTE jobs**.

These wider effects arise because fluoropolymer manufacturing is embedded in EU supply chains. Production generates upstream demand for chemicals, utilities, refined petroleum products, logistics, wholesale trade and professional services. The sector also supports induced activity through wage spending associated with direct and indirect employment.

Table 0.2: Economic footprint of EU27 fluoropolymer manufacturing, 2025

	Output	GVA	Employment
Direct footprint	€620m	€150m	2,800 FTE
Total footprint, including indirect and induced effects	€1.6bn	€550m	14,500 FTE

Fluoropolymers enable downstream sectors far larger than the fluoropolymer market itself.

The economic importance of fluoropolymers cannot be assessed by reference to fluoropolymer sales alone. In many applications, fluoropolymers account for a small share of input value but perform functions that are critical to downstream product performance, reliability, durability or compliance.

The report therefore assesses downstream value at risk in selected fluoropolymer-dependent applications. Due to practical constraints and data availability, the quantified analysis focuses on transport, energy and sealings. These areas were selected because they are economically material, strategically relevant and could be mapped to downstream economic data with sufficient robustness for quantified analysis. These are not the only relevant sectors or applications: fluoropolymers are also used in many other areas such as semiconductors, electronics, construction, medical applications and broader industrial uses. The analysis is therefore an exposure assessment for selected applications, not a comprehensive quantification of all downstream activity linked to fluoropolymers. It is not a forecast of losses, but an estimate of the scale of downstream activity associated with applications where fluoropolymers perform enabling functions and where substitution may be difficult or not viable in the short run.

Under the baseline no-derogation scenario, fluoropolymer applications are associated with approximately:

- €330 billion of transport output, €77 billion of GVA and 727,100 FTE jobs exposed;
- €9.0 billion of energy-related output, €2.9 billion of GVA and 25,000 FTE jobs exposed; and
- €20 billion of sealing-related output, €5.1 billion of GVA and 54,900 FTE jobs exposed.

The report also assesses the implications of a derogation-based approach. The main-case assumptions are that 50 per cent of relevant transport fluoropolymer sales value remains restricted, 90 per cent of relevant energy sales value remains restricted, and 100 per cent of relevant sealing sales value remains restricted.

These assumptions reflect the relatively narrow or uncertain coverage of the derogation framework, especially for cross-cutting and energy-related applications.

Applying these assumptions to the central baseline value-at-risk estimates indicates that material downstream activity could remain exposed even after derogations are taken into account. The derogation-adjusted estimates are approximately:

- €165 billion of transport output, €39 billion of GVA and 364,000 FTE jobs;
- €8.1 billion of energy-related output, €2.6 billion of GVA and 22,500 FTE jobs; and
- €20 billion of sealing-related output, €5.1 billion of GVA and 54,900 FTE jobs.

Table 0.3: Downstream value-at-risk estimates

Area	Central baseline output at risk	Residual restricted share	Derogation-adjusted output at risk	Derogation-adjusted GVA at risk	Derogation-adjusted employment at risk
Transport	€330bn	50%	€165bn	€39bn	364,000 FTE
Energy	€9.0bn	90%	€8.1bn	€2.6bn	22,500 FTE
Sealings	€20bn	100%	€20bn	€5.1bn	54,900 FTE

Sealings are a cross-cutting application category and should be interpreted alongside, rather than added mechanically to, the transport and energy estimates. The figures are measures of exposure, not forecasts of losses.

The strategic issue is not only whether selected end uses are exempted or derogated. It is whether the derogation framework preserves enough aggregate demand to sustain viable EU fluoropolymer production.

Some strategic uses, particularly defence, may account for relatively small fluoropolymer volumes but have high strategic importance, especially in the context of the EU's growing focus on security, resilience and strategic autonomy. The same applies to other critical sectors, including medical, aerospace, semiconductors and clean technologies. However, these volumes may not be sufficient on their own to sustain EU production capacity. Fluoropolymer manufacturing involves specialised assets, technical know-how, regulatory obligations and fixed costs. Stakeholders therefore argue that production viability depends on demand across a wider portfolio of applications, including transversal uses such as sealings and lubricants.

If restrictions remove a substantial share of this wider demand base, EU production could become less viable even where selected strategic uses are formally derogated. In that case, a derogation for defence or other critical applications may be of limited practical value if the EU production base needed to supply those applications is weakened or lost.

The resulting risk is increased dependence on non-EU supply chains. Depending on the final scope and enforcement of the restriction, this could mean greater reliance on imported fluoropolymers, imported fluoropolymer-containing components, or finished and semi-finished goods produced outside the EU using fluoropolymer inputs. This would run counter to EU objectives on industrial resilience, economic security, clean technology deployment and strategic autonomy.

Overall, the analysis shows that fluoropolymers should be assessed as enabling inputs within wider industrial value chains, not only by reference to their direct sales value. The proportionality assessment should therefore consider the combined effect of restrictions on EU manufacturing capability, import dependence, downstream exposure and the viability of supplying strategic uses under a narrow derogation framework.

1 Introduction

1.1 Policy context

The European Union is currently considering a broad restriction on per- and polyfluoroalkyl substances (PFAS) under the REACH Regulation, including the possible use of derogations for certain substances or applications. Within this process, fluoropolymers have emerged as a distinct category due to their role in critical industrial applications, their contribution to strategic value chains and the limited availability of technically and economically viable substitutes in many uses.

The Fluoropolymers Product Group (FPG) supports the view that fluoropolymers are critical to the resilience of the European industrial base and should therefore be exempted from the proposed restriction. The FPG also argues that the design of any derogations is important. If derogations are limited to selected fluoropolymers or narrowly defined applications, EU manufacturers may not be able to maintain the scale of production needed to operate viably in Europe.

In particular, the policy debate has focused on the role of fluoropolymers in supporting sectors linked to EU competitiveness, strategic autonomy and critical technologies, including semiconductors, clean energy, electronics, medical, defence, aerospace and automotive manufacturing. In the view of the FPG, these sectors (which include sectors widely recognised as having a strategic or security dimension) depend not only on access to individual fluoropolymers for specific applications, but also on the continued presence of a functioning European fluoropolymer manufacturing base.

A central issue within the debate therefore concerns the resilience and continuity of fluoropolymer supply within Europe. Demand for fluoropolymers in strategic applications is increasing while EU production capacity is under pressure, creating a growing reliance on imports and exposing downstream industries to potential supply-chain vulnerabilities. If restrictions or narrowly scoped derogations reduce the viability of EU production, this could further increase dependence on non-EU supply, which in the view of the FPG would weaken industrial resilience, increase exposure to supply disruptions and undermine the EU's strategic autonomy in critical technologies.

Within this context, the socio-economic assessment focuses not only on the direct economic contribution of fluoropolymer manufacturing, but also on the broader role fluoropolymers play in supporting downstream industrial activity, maintaining viable manufacturing capability within Europe and contributing to wider economic resilience.

1.2 Purpose of this report

Europe Economics was commissioned by the Fluoropolymers Product Group (FPG) of Plastics Europe to collect, aggregate and assess socio-economic evidence relating to fluoropolymer manufacturing in Europe in support of the European Chemicals Agency (ECHA) Socio-Economic Assessment Committee (SEAC) consultation regarding the proposed PFAS restriction.

The purpose of this report is to quantify the economic footprint of fluoropolymer manufacturing within the EU and assess its role in downstream industrial activity and strategic value chains. The analysis combines aggregated manufacturer data with publicly available economic data to estimate direct, indirect and induced economic impacts, assess supply dependence and external trade position, and map fluoropolymer supply to downstream sectors.

The analysis is intended to support assessment of the economic significance of fluoropolymers within the European economy, including their contribution to industrial activity, supply-chain resilience and strategic sectors linked to critical technologies. In line with the project scope, the assessment focuses on fluoropolymer manufacturing activity rather than direct evidence collection from downstream users, which are providing separate inputs within the wider SEAC consultation process.

2 Analytical approach

This chapter sets out the data sources and methodology used to estimate the economic footprint of EU fluoropolymer manufacturing and the downstream value potentially at risk under restriction scenarios.

The analysis is designed to be proportionate and transparent. It focuses on the two central economic questions addressed in this report: first, the scale of economic activity supported by EU fluoropolymer manufacturing; and second, the extent to which downstream sectors may be exposed if fluoropolymer supply is restricted. The methodology reflects the practical constraint that fluoropolymers are not separately identified in official input-output statistics.

2.1 Data

The approach combines manufacturing data provided by members of Plastics Europe with public datasets, including Eurostat input-output tables, to develop estimates of wider economic activity and downstream exposure.

2.1.1 Manufacturer data

The primary input to the analysis is a consolidated dataset compiled from information provided by seven EU fluoropolymer producers, which are understood to account for all major fluoropolymer production within the EU27. The dataset therefore provides a robust basis for estimating the economic footprint of EU27 fluoropolymer manufacturing.

The dataset should not, however, be interpreted as a complete measure of the total fluoropolymer market supplied to EU downstream users. The EU market is also supplied by imports from producers outside the EU27. For this reason, the report separately considers the size and supply structure of the European fluoropolymer market in Section 3.1.

The manufacturer dataset includes information on fluoropolymer production, sales and employment. These data provide the basis for estimating the direct economic footprint of EU fluoropolymer manufacturing. Where available, producer data have also been used to allocate sales by downstream application or sector, using categories aligned with the ECHA sector mapping and the wider socio-economic assessment framework. Manufacturers were also asked to provide more detailed mapping for three priority areas: transport, energy and sealings. This additional mapping was used to support the downstream value-at-risk assessment, particularly where ECHA categories describe cross-cutting application groups rather than final downstream sectors.

The manufacturer data are commercially sensitive, and the analysis therefore applies aggregation and confidentiality principles to ensure that no company-level information is disclosed in the report. For the sectoral and downstream analyses, results are only reported where they are based on data from at least three manufacturers. Where fewer than three manufacturers contribute to a result, or where a result could otherwise risk revealing the position of an individual producer, the result is suppressed or combined with other categories. All results are reported in rounded form to further preserve confidentiality.

2.1.2 Eurostat I-O tables

Eurostat input-output tables are used to estimate the wider economic footprint of EU fluoropolymer manufacturing. These tables describe inter-industry relationships within the economy, showing how output

from one sector is used as an input by others. They therefore provide a basis for estimating indirect supply-chain effects and induced effects associated with household spending. The most recently published Eurostat I-O tables for the EU27 are from 2023.

Fluoropolymer manufacturing is not separately identified in the input-output framework. The analysis therefore uses the closest available sector proxy, chemicals and chemical products,¹ to estimate wider economy effects from the direct output reported by manufacturers.

2.1.3 Eurostat Structural Business Statistics

Eurostat Structural Business Statistics (SBS) are used to estimate sector-level output, GVA and employment for downstream activities. SBS data provide the main public economic denominators for sectors where fluoropolymer applications can be mapped to NACE industrial classifications, such as transport manufacturing.

SBS data are also used to derive GVA-to-output and employment-to-output ratios. These ratios are applied where the downstream denominator is based on PRODCOM product-level production values, which do not include GVA or employment measures.

PRODCOM data are also used as the main source for estimating the economic scale of several downstream fluoropolymer-using sectors, where relevant fluoropolymer applications can be linked to specific product categories. In this context, PRODCOM provides more targeted estimates than broad sector-level data, although the estimates capture sold production rather than total market size including imports.

2.1.4 Eurostat NACE construction data

Eurostat NACE data are used only for the construction sector estimate in the assessment of the economic scale of downstream fluoropolymer-using sectors. NACE is used instead of PRODCOM or SBS data because it classifies economic activity by industry rather than by product, making it more appropriate for capturing construction as a sector-level activity.

2.1.5 PRODCOM production data

PRODCOM data are used where product-level production values provide a more targeted measure of downstream activity than broad sector-level SBS data, or where the relevant SBS sector is confidential. PRODCOM reports production values for specific manufactured products, rather than output, GVA and employment by industrial sector.

In the downstream value-at-risk assessment, PRODCOM data are used for selected energy and semiconductor-related applications. For these applications, PRODCOM sold production values are used as product-level output proxies. GVA and employment are then estimated using ratios derived from the closest available SBS sector.

2.1.6 Comtrade data

UN Comtrade data is used to estimate imports of fluoropolymers to the EU27 market, which informs our market size assessment. We take volumes for 2025 reported under product codes HS 390461 and HS 390469 in 2025. HS 390461 covers polytetrafluoroethylene in primary forms, while HS 390469 covers other fluoropolymers in primary forms.

¹ CPA C20 “Chemicals and Chemical Products”

2.2 Methodology

2.2.1 Economic footprint modelling

The economic footprint analysis estimates the direct, indirect and induced economic activity associated with EU fluoropolymer manufacturing.

The analysis begins with the direct manufacturing footprint, derived from producer-reported information on fluoropolymer production, sales and employment. Direct output is based on the reported sales value of EU-produced fluoropolymers used in the footprint model. Direct employment is based on reported full-time equivalent employment. Direct GVA is estimated using a GVA coefficient derived from the input-output framework. This means that imported fluoropolymers are not included in the direct manufacturing footprint, because they do not generate EU manufacturing output, GVA or upstream supply-chain effects in the same way as domestically produced fluoropolymers. The modelling also does not estimate the smaller EU service-sector activity associated with importing and distributing those fluoropolymers.

To estimate wider economic effects, the analysis applies an input-output framework using Eurostat EU27 input-output tables. Because fluoropolymer manufacturing is not separately identified within official statistical classifications, the activity is represented within the input-output framework using CPA_C20, manufacture of chemicals and chemical products, which is the closest corresponding Eurostat sector classification. Producer-reported fluoropolymer output is treated as an exogenous production shock applied to this sector within the input-output framework.

The model is used to estimate indirect effects, reflecting upstream demand generated through purchases of intermediate goods and services, including chemicals, utilities, transport, wholesale trade and business services. The analysis also estimates induced effects, which reflect additional economic activity supported through household spending associated with wages generated by direct and indirect activity.

Type I multipliers are used to estimate direct and indirect effects. Type II multipliers are used to estimate direct, indirect and induced effects. The total economic footprint is defined as the sum of direct, indirect and induced effects. Impacts are estimated across output, GVA and employment.

2.2.2 Downstream value-at-risk assessment

Scope and analytical approach

The downstream value-at-risk assessment estimates the scale of economic activity potentially exposed to fluoropolymer restrictions under a baseline no-derogation scenario. Specifically, the analysis estimates downstream output, GVA and employment associated with industrial activities in which fluoropolymers play a functionally important role and where substitution may be difficult or not viable in the short run. The analysis is intended to provide an indicative estimate of potential economic exposure across affected downstream value chains rather than a forecast of direct economic losses.

The assessment is based on three producer-data groupings: transport, energy and sealings. The transport and energy submissions were reported as downstream sector groups, while the sealings submissions were reported as a cross-cutting application group covering sealing applications used across transport, energy, semiconductors and other strategic sectors.

The modelling follows three steps. First, manufacturer-reported applications are mapped to downstream sectors or product markets. Second, an activity-share assumption is applied to identify the portion of downstream activity relevant to the fluoropolymer application. Third, a criticality assumption is applied to reflect manufacturer evidence on substitutability.

The core relationship is:

Effective dependency = activity share × criticality

The effective dependency is then applied to the relevant economic denominator:

Output exposed = downstream output denominator × effective dependency

For SBS-led calculations, GVA and employment at risk are calculated by applying the same effective dependency to SBS GVA and employment. For PRODCOM-led calculations, PRODCOM sold production is used as a product-level output proxy, and GVA and employment are estimated using GVA-to-output and employment-to-output ratios from the closest available SBS sector.

2.2.3 Scenario development and estimation approach

Low, central and high scenarios were developed for each downstream subsector or application group. These scenarios reflect uncertainty in both the activity share and criticality assumptions. The activity share captures the proportion of the downstream economic denominator relevant to the fluoropolymer application. The criticality assumption captures the extent to which the relevant activity is materially dependent on fluoropolymers, based primarily on manufacturer evidence on substitutability.

Table 2.1 Scenario Bands Used for Criticality Assumptions

Criticality rating	Range for criticality percentage (%)
Low	0-25
Central	25-75
High	75-100

The combined effective dependency represents the proportion of the downstream denominator treated as exposed in the baseline no-derogation scenario. For example, where a broad sector denominator is used, the activity share may be low even if criticality is high, because only part of the sector is relevant to the fluoropolymer application. Conversely, where a product-specific PRODCOM denominator is used, the activity share may be high because the product category is already closely aligned with the application.

Table 2.2: Activity share and criticality assumptions

Area	Subsector / application	Activity share	Criticality	Effective dependency range
Transport	Road vehicles	Medium	High	15% - 40%
Transport	Rail vehicles	Low to Medium	Medium	1.25% - 18.75%
Transport	Aerospace	Medium	High	15% - 40%
Transport	Maritime / watercraft	Low to Medium	Medium to High	1.25% - 18.75%
Energy	PV	High	Medium	22.5% - 75%
Energy	Hydrogen technologies	Low	High	0.4% - 2%
Energy	Batteries – non-EV / storage	Low	High	3.75% - 20%
Energy	Chlor-alkali membranes	Low	High	7.5% - 30%
Sealings	Transport sealings	Low	High	0.4% - 2%
Sealings	Energy sealings	Low	High	0.4% - 2%
Sealings	Semiconductor sealings	Medium	High	15% - 40%

The ranges are deliberately wider where the mapping from fluoropolymer application to downstream activity is less precise. For example, rail, maritime and some sealing applications use broad downstream denominators and therefore require wider low-to-high ranges. By contrast, the assumptions are narrower where manufacturer evidence points to well-defined applications or where product-level data provide a closer denominator. The central case should therefore be interpreted as a reasonable point estimate within an uncertainty range

2.2.4 Assumptions and limitations

The analysis is subject to the following caveats that should be kept in mind when interpreting the results.

- Fluoropolymers are not separately identified within official statistical classifications. The economic footprint modelling therefore uses CPA_C20, manufacture of chemicals and chemical products, as the closest available input-output proxy.
- Activity-share and criticality assumptions are necessarily judgement-based. They are informed by manufacturer evidence, ECHA application mapping and public economic data, but there is no official statistical source that directly identifies the share of downstream output dependent on fluoropolymer applications. The wide ranges for some effective dependency assumptions reflects the uncertainty inherent in mapping specialised fluoropolymer applications to broad downstream economic sectors.
- PRODCOM and SBS data are not identical measures. SBS reports sector-level output, GVA and employment, while PRODCOM reports product-level production values. Where PRODCOM is used, GVA and employment are estimated using ratios from the closest available SBS sector.
- Input-output models assume fixed production relationships between sectors and do not capture dynamic behavioural responses, substitution effects, technological adjustment or long-term market adaptation.

3 Economic footprint of EU fluoropolymer manufacturing

This chapter first considers the size and supply structure of the European fluoropolymer market, before estimating the economic footprint of fluoropolymer manufacturing within the EU. Total market demand captures the volume of fluoropolymers used by European downstream sectors, regardless of origin. The economic footprint estimates capture the direct, indirect and induced economic activity supported by fluoropolymer production within the EU. This chapter provides the basis for assessing the sector's contribution to the EU industrial base.

3.1 Size and supply structure of Europe's fluoropolymer market

Before estimating the economic footprint of EU fluoropolymer manufacturing, it is useful to distinguish between two related but different measures: the total size of the European fluoropolymer market and the economic activity supported by fluoropolymer manufacturing within the EU. The producer dataset provides the basis for estimating the latter. It captures production, sales and employment associated with responding EU manufacturers. These production data cover EU-produced fluoropolymers supplied both to the EU market and to export markets. They do not provide a complete estimate of the volume of fluoropolymers placed on the EU27 market, because the market is also supplied by imports from non-EU producers, including production from European countries outside the EU27.

To estimate the imports of fluoropolymers to the EU, we have analysed Comtrade data for the two main HS codes covering fluoropolymers in primary forms: HS 390461, covering polytetrafluoroethylene in primary forms, and HS 390469, covering other fluoropolymers in primary forms. Comtrade reports EU imports under these two codes of approximately 41.7 kt in 2025, comprising 23.3 kt under HS 390461 and 18.4 kt under HS 390469. This is substantially above the 9.7 kt of imports reported in the producer dataset and is broadly consistent with the conclusion that the producer data do not capture total import supply to the EU market.

Combining estimated EU27-produced supply sold into the EU27 with Comtrade import data implies a total EU27 market size in 2025 of approximately 56.5 kt. EU27-produced supply sold into the EU27 is calculated as EU27 production less exports outside the EU27.

A separate estimate of the market size can be developed through an extrapolation of the volumes set out in the previous socioeconomic analysis (SEA) of the European fluoropolymer industry by Wood, which estimated the market size in 2020 to be 40kt and cited research indicating expected compound annual growth for fluoropolymers of 6.5 per cent per annum.² Extrapolation of the 2020 estimate using the 6.5 per cent CAGR gives a 2025 estimate of 55kt. The 2023 FPG SEA provides a further cross-check.³ It reported that an update of the Wood analysis using member data estimated 2022 fluoropolymer volumes at 40–95 kt.

3.1.1 Estimated 2025 market size

The central estimate used in this report for the 2025 European fluoropolymers market is 56.5kt. This estimate is based on combining producer data with Comtrade statistics, cross-checked against the previous estimates

² Wood (2022) "Update of market data for the socioeconomic analysis (SEA) of the European fluoropolymer industry" [\[online\]](#)

³ Fluoropolymer Product Group (2023) "Socioeconomic impact assessment for fluoropolymers" [\[online\]](#)

of the market's size. The estimate should be interpreted as an indicative market-sizing assumption rather than a directly observed EU27 total.

Table 3.1 presents an indicative supply structure for the EU27 fluoropolymer market in 2025, based on the central market estimate. The producer data indicate that responding manufacturers produced approximately 29,500 tonnes of fluoropolymers in the EU27 in 2025 and exported approximately 15,000 tonnes outside the EU27. This implies that around 14,500 tonnes of EU27-produced fluoropolymers were supplied to the EU27 market.

Table 3.1: Estimated EU27 fluoropolymer market size and structure, 2025

Quantities (tonnes)	EU27
Tonnes produced in the EU27	29,500
Tonnes imported into the EU27	42,000
Tonnes exported from the EU27	15,000
EU27-produced supply sold in the EU27	14,500
Tonnes sold in the EU27	56,500
Implied share of EU sales supplied by EU	25%
Implied share of EU sales supplied by non-EU	75%

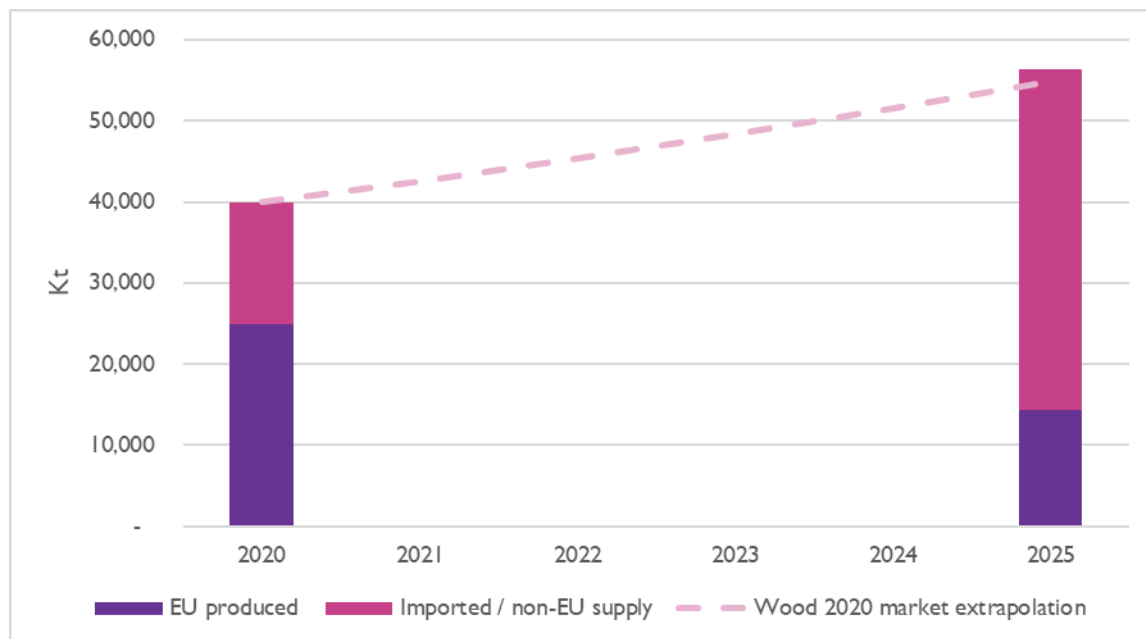
Figures are rounded to the nearest 500 tonnes. Shares are calculated using unrounded figures where available and rounded to the nearest whole percentage point. Comtrade imports refer to EU imports reported under HS 390461 and HS 390469 in 2025. HS 390461 covers polytetrafluoroethylene in primary forms, while HS 390469 covers other fluoropolymers in primary forms.

On this basis, EU27-produced fluoropolymers are estimated to account for approximately 25 per cent of EU27 market sales in 2025, with non-EU supply accounting for the remaining 75 per cent. This indicates substantial reliance on supply from outside the EU27 production base.

Figure 3.1 compares Wood's 2020 estimate of fluoropolymers sold in the EU28 with the 2025 market estimate based on producer data and imports estimated from Comtrade. The 2025 estimate is closely aligned, although slightly above, the extrapolated Wood estimate. The analysis implies that the share of market demand supplied by imports or non-EU production has increased substantially, from around 38 per cent in 2020 to around 75 per cent in 2025.

This import dependence comparison should be interpreted cautiously because the 2020 and 2025 figures differ in geographic scope – UK production that would previously have been treated as part of the EU28/EEA production base is now treated as non-EU supply from an EU27 perspective. Nonetheless, the estimates indicate that the share on the EU market supplied from outside the EU27 production base has increased substantially.

Figure 3.1: Indicative change in European fluoropolymer market supply structure, 2020–2025



2020 figures are based on Wood’s estimate of fluoropolymers sold in the EU28/EEA, split between EU-produced supply and imports. The 2025 figures are based on the central market estimate used in this report and producer data collected for this study. The dotted line shows an extrapolation of Wood’s 2020 market estimate using the annual growth assumption referenced in the Wood analysis; it is included as an indicative trend rather than an observed market series.

3.2 Direct manufacturing footprint

Fluoropolymers are used in a range of industrial applications connected to wider European value chains, including advanced manufacturing and technology-intensive sectors. Their manufacture within the EU is therefore relevant as an economic activity in its own right and as an input into downstream industrial activity. This section quantifies the direct footprint of EU fluoropolymer manufacturing by assessing production, value, employment and trade position. These estimates provide the basis for understanding the sector’s economic footprint and its links to wider industrial value chains.

3.2.1 Scale of EU production

In Table 3.2 we set out the core indicators of EU fluoropolymer manufacturing activity. In 2025, participating manufacturers produced around 29,500 tonnes of fluoropolymers in the EU, with a reported sales value of EU-produced product of approximately €620 million and direct employment of around 2,800 FTEs. This provides the baseline for assessing both the direct manufacturing footprint and the wider activity supported through upstream and downstream value chains.

Table 3.2: EU Fluoropolymer Manufacturing Footprint: Production, Value and Employment (2025)

Category	Value
Tonnes produced in EU (t)	29,500
Reported sales value of product produced in the EU (€m)	620
Direct employment (FTE)	2,800

Sales values are reported in € million and rounded to two significant figures. Production volumes are rounded to the nearest 100 tonnes. Employment is reported in full-time equivalents (FTE) and rounded to the nearest 100. The reported sales value of product produced in the EU is based on manufacturer responses and is used as the direct output measure for the economic footprint modelling.

3.2.2 Exports

EU fluoropolymer manufacturers supply substantial volumes to non-EU markets. Table 3.3 presents exports of EU-produced fluoropolymers by the responding manufacturers to non-EU markets in 2025. Participating manufacturers exported around 15,200 tonnes of EU-produced fluoropolymers, with a sales value of approximately €700 million. This indicates that EU production contributes both to EU market supply and to international value chains, as well as supporting the EU's external trade position in specialised materials.

Table 3.3: EU Fluoropolymer Exports to Non-EU Markets (2025)

Export metric	Value
Tonnes exported from EU production to outside the EU (t)	15,200
Sales value of exports from EU production (€m)	700

Sales values are reported in € million and rounded to two significant figures. Export volumes are rounded to the nearest 100 tonnes.

3.3 Wider economic footprint

The wider economic footprint captures the total activity supported by fluoropolymer manufacturing across the European economy. This includes the direct activity of EU fluoropolymer producers, indirect effects through purchases from upstream suppliers, and induced effects associated with household spending by workers and shareholders supported directly and indirectly by the sector.

In Table 3.5 we summarise the direct, indirect, induced and total effects in 2025. These estimates are based on multipliers derived from input-output tables for the EU economy. Fluoropolymer manufacturing is not separately identified in the input-output framework, so the analysis uses the closest available sector proxy, chemicals and chemical products. Direct fluoropolymer output is applied to this sector, and the input-output relationships are used to estimate the additional activity supported across suppliers and the wider economy.

Two sets of multipliers are used. Type I multipliers capture direct and indirect effects, including the activity supported through purchases from upstream suppliers. Type II multipliers include these effects and also capture induced activity generated when wages supported by direct and indirect activity are spent in the wider economy. On this basis, the Type II output multiplier is 2.61, meaning that each €1 of direct fluoropolymer output supports approximately €2.61 of output across the EU economy once direct, indirect and induced effects are included.

Table 3.4: Parameters and multipliers used in economic modelling

Multiplier / coefficient	Value	Interpretation
GVA coefficient	0.24	Direct GVA generated per €1 of direct fluoropolymer output.
Type I output multiplier	2.18	Direct and indirect output supported per €1 of direct fluoropolymer output.
Type II output multiplier	2.61	Direct, indirect and induced output supported per €1 of direct fluoropolymer output.
Type I GVA multiplier	0.69	Direct and indirect GVA supported per €1 of direct fluoropolymer output.
Type II GVA multiplier	0.89	Direct, indirect and induced GVA supported per €1 of direct fluoropolymer output.
Type I employment multiplier	7.28	Direct and indirect FTE jobs supported per €1 million of direct fluoropolymer output.
Type II employment multiplier	23.5	Direct, indirect and induced FTE jobs supported per €1 million of direct fluoropolymer output.

The equivalent Type II GVA multiplier is 0.89, meaning that each €1 of direct fluoropolymer output supports approximately €0.89 of GVA across the economy. The employment multiplier is 23.5 FTE jobs per €1 million

of direct output, reflecting the direct jobs supported in fluoropolymer manufacturing and the additional jobs supported through supply-chain and wage-spending effects.

Applying these multipliers to the direct manufacturing footprint, the model estimates that EU fluoropolymer manufacturing supports approximately €1.6 billion of output, €550 million of GVA and 14,500 FTE jobs across the EU economy. This is substantially larger than the direct footprint alone, which is approximately €620 million of output, €150 million of GVA and 2,800 FTE jobs.⁴ The difference reflects the sector's links to upstream industries – including chemicals, utilities, wholesale trade, refined petroleum products, transport and professional services – and the wider economic activity supported through household spending.

Table 3.5: Wider Economic Footprint of EU Fluoropolymer Manufacturing (2025)

Effects	Output (€m)	GVA (€m)	Employment (FTE)
Direct	620	150	2,800
Indirect	730	280	1,700
Induced	260	120	10,000
Total	1,600	550	14,500

Monetary values are reported in € million and rounded (for Direct, Indirect and Induced lines, though not for Totals) to two significant figures. Employment is reported in full-time equivalents (FTE) and rounded to the nearest 100. Multipliers are derived from EU input-output tables.

The Type II employment effect is larger than the direct and indirect employment effects because it includes employment supported through household spending by workers whose jobs are supported directly or indirectly by EU fluoropolymer manufacturing. This induced effect is spread across a wide range of consumer-facing and service sectors, which are generally more labour-intensive than fluoropolymer manufacturing itself. The Type II employment estimate should therefore be interpreted as the wider economy-wide employment supported by the sector, rather than employment within fluoropolymer manufacturing or its immediate supply chain alone.

3.4 Upstream supply-chain

Fluoropolymer manufacturing generates demand for intermediate inputs from a range of upstream sectors. These supply-chain effects show how production in the sector translates into output in other parts of the European economy, reflecting its integration within the wider industrial base.

Table 3.6 identifies the upstream sectors most affected through the supply chain, ranked by output impact. The largest indirect effect is in chemicals and chemical products, at approximately €130 million, representing 19 per cent of total indirect output. This reflects the sector's reliance on chemical inputs and related intra-sector supply-chain activity. Other material upstream impacts are observed in wholesale trade, utilities, refined petroleum products, professional services and land transport. Together, the six sectors shown in Table 3.6 account for almost half of total indirect output. This concentration reflects the combination of specialist chemical inputs, energy use, logistics and business services required to support fluoropolymer manufacturing.

⁴ To see the relationship between these figures and the multipliers set out above, it may help to note that, for example, $0.89 \times \text{€}0.62\text{bn} = \text{€}0.55\text{bn}$, whilst $\text{€}0.62\text{bn} \times 2.61 = \text{€}1.6\text{bn}$ and $23.5 \times 620 = 14,570$ (difference due to rounding).

Table 3.6: Top Upstream Sectors by Output Impact from EU Fluoropolymer Manufacturing (2025)

CPA category	Sector	Output Impact (€m)	Share of Total Indirect Output (%)
CPA_C20	Chemicals and chemical products	130	19
CPA_G46	Wholesale trade, except motor vehicles	58	8
CPA_D	Electricity, gas, steam and air conditioning	51	7
CPA_C19	Coke and refined petroleum products	42	6
CPA_M69_70	Legal, accounting, management and consultancy activities	37	5
CPA_H49	Land transport and transport via pipelines	29	4

CPA_C20 (chemicals and chemical products) excludes direct fluoropolymer manufacturing activity and reflects only additional intra-sector supply-chain effects within the chemicals sector. Monetary values are reported in € million and rounded to two significant figures. Shares are calculated using unrounded values and rounded to the nearest whole percentage point.

3.5 What these results show

The results in this chapter show that EU fluoropolymer manufacturing has an economic footprint that extends beyond the direct value of production. In 2025, the responding manufacturers directly supported approximately **€620 million of output**, **€150 million of GVA** and **2,800 FTE jobs**. Once indirect and induced effects are included, the estimated economy-wide footprint rises to approximately **€1.6 billion of output**, **€550 million of GVA** and **14,500 FTE jobs**.

The analysis also shows that EU fluoropolymer manufacturing is embedded in wider industrial supply chains. The sector supports upstream activity in chemicals, utilities, refined petroleum products, logistics, wholesale trade and professional services. These linkages mean that disruption to EU fluoropolymer manufacturing would not only affect the producers themselves, but would also have implications for suppliers and related economic activity across the EU economy.

The supply data further indicate that EU production remains an important source of fluoropolymers placed on the EU market within the responding manufacturer dataset, while EU producers also supply non-EU markets. This points to the role of EU fluoropolymer manufacturing both as a domestic supply base and as part of international value chains.

The key implication is that the economic significance of fluoropolymers cannot be assessed only by reference to the direct value of production. EU fluoropolymer manufacturing supports upstream activity across the economy and supplies downstream applications in strategic sectors. The next chapter therefore examines the scale of downstream value potentially exposed where fluoropolymers perform enabling functions and substitution options are limited. The downstream analysis considers a different but complementary question: the scale of economic activity in sectors that depend on continued access to fluoropolymers for specific applications where substitution may be difficult or not technically viable.

4 Downstream value at risk

Fluoropolymers are enabling inputs in a wide range of downstream applications, including defence, transport, medical technologies, energy technologies, semiconductors, electronics, sealing systems and wider industrial uses. In many of these applications, they account for a small share of final product value but provide functions that are difficult to replicate, including chemical resistance, thermal stability, durability, electrical performance and reliability in demanding operating environments.

This means that the economic relevance of fluoropolymers cannot be assessed by reference to fluoropolymer sales alone. Where substitution is difficult or not viable in the short run, reduced access to fluoropolymers could expose substantially larger downstream value chains. This chapter therefore estimates the downstream output, GVA and employment associated with selected fluoropolymer-dependent applications under a baseline no-derogation scenario. The analysis focuses on transport, energy and sealings, reflecting their economic materiality, technical criticality and relevance to EU industrial capability.

4.1 Mapping fluoropolymers to downstream uses

The analysis begins by mapping fluoropolymer sales to ECHA application sectors to provide an indication of where demand for these materials is concentrated and how fluoropolymer supply is connected to downstream manufacturing activity.

The ECHA mapping provides a common structure for classifying fluoropolymer uses, but it should not be interpreted as a set of mutually exclusive downstream economic sectors in all cases. Some categories describe end-use sectors, such as transport or energy, while others describe application types that can occur across several sectors. Sealing applications are the clearest example: fluoropolymer seals, gaskets, O-rings and related components may be used in transport, energy, semiconductor manufacturing, chemical processing and wider industrial equipment.

Pharmaceutical-related uses are not quantified as a separate downstream sector in this analysis. However, they are relevant to several categories covered by the mapping, including medical applications, other medical uses, broader industrial uses and cross-cutting applications such as high-performance sealings. These uses may be important to pharmaceutical and biopharmaceutical manufacturing, where fluoropolymers may support high-purity fluid handling, filtration, process equipment, gaskets and seals used in demanding chemical, sterile or regulated operating environments.

The figures in Table 4.1 are based on manufacturers' best efforts to classify sales according to the ECHA application categories. As a result, they provide a useful indication of where fluoropolymers are used, but some categories should be interpreted as application mappings rather than final downstream sectors. This is reflected in the value-at-risk analysis, which treats sealings as a cross-cutting application category and avoids adding sealing-related exposure mechanically to sector estimates where this could create double-counting.

These figures measure the value and volume of fluoropolymers sold into each application area. They do not measure the full downstream economic activity supported by those applications. The value-at-risk analysis therefore uses these sales data as a mapping tool, alongside public economic data, to estimate the larger downstream output, GVA and employment potentially exposed.

Table 4.1: EU Fluoropolymer Sales to Downstream Applications by ECHA Sector (2025)

ECHA Sector	Sum of Value sold onto EU market (€m)	Sum of Quantity sold onto EU market (t)
Sealing applications	330	10,000
Transport	130	5,100
Lubricants	84	900
Electronics and semiconductors (Semiconductors)	64	2,200
Broader industrial uses	60	2,200
Energy	50	1,200
Electronics and semiconductors (Electronics)	30	700
Technical Textiles	20	900
Construction products	18	1,100
Food contact materials (FCM) and packaging	13	900
Medical devices	12	300
Other medical applications	4	100
Military applications	2	100

Monetary values are reported in € million and rounded to approximately two significant figures, with additional rounding applied to smaller values for confidentiality reasons. Production volumes are rounded to the nearest 100 tonnes.

The results show that demand is not concentrated in a single end market. Sealing applications account for the largest reported EU market sales, at around €330 million and 10,000 tonnes, followed by transport at around €130 million and 5,100 tonnes. Electronics and semiconductors, broader industrial uses and energy applications also account for material sales. However, the ranking of direct fluoropolymer sales should not be read as a ranking of downstream value-at-risk. Downstream exposure depends not only on the value of fluoropolymer inputs, but also on the scale of the downstream value chain and the extent to which fluoropolymers are technically substitutable.

For the value-at-risk analysis, we asked manufacturers to provide more detailed mapping for three priority areas: transport, energy and sealings. The additional mapping was used to identify more precisely which downstream activities were linked to fluoropolymer applications in these areas.

This additional step was particularly important for sealings. In the ECHA mapping, sealing applications are reported as a distinct category, but sealings are not a single downstream sector. Fluoropolymer seals, gaskets, O-rings and related components can be used across transport, energy, semiconductor manufacturing, chemical processing and wider industrial applications. Table 4.2 therefore shows how sealing applications have been allocated to downstream uses where manufacturers provided sufficient information. For this reason, the values used in the downstream value-at-risk analysis do not necessarily correspond one-for-one to the rows in the ECHA mapping in Table 4.1.

Table 4.2: Mapping of sealings applications to downstream sectors (2025)

Downstream sector	Tonnes (t)	Value (€m)	Criticality
Transport	4,400	157	High
Energy and other strategic uses	2,700	110	Medium to High (depending on application)
Semiconductors	1,100	56	High

Monetary values are reported in € million and rounded to two significant figures. Production volumes are rounded to the nearest the nearest 100 tonnes. Energy has been aggregated with other strategic uses for confidentiality reasons, where category-level reporting did not meet the minimum disclosure threshold.

Transport applications account for around **4,400 tonnes** and **€157 million** of reported sales of sealings, while semiconductor applications account for around **1,100 tonnes** and **€56 million**. Energy and other strategic uses are smaller in reported sealings sales, but include applications such as photovoltaic and hydrogen technologies.

4.2 Economic scale of downstream fluoropolymer-using sectors

Fluoropolymers are used in downstream sectors that are substantially larger than the fluoropolymer market itself. This is because fluoropolymers often account for a small share of input value but perform enabling functions in products or processes where performance, durability, chemical resistance, electrical insulation or reliability are important. Table 4.3 summarises the economic scale of selected downstream sectors and product markets in which fluoropolymers are used. The table is intended to provide context for the value-at-risk analysis. It does not imply that the full output of each sector is dependent on fluoropolymers.

Table 4.3: Economic scale of selected downstream sectors in which fluoropolymers are used

Sector	Output (€ m)	Source and scope note
Automotive	1,068,214	Eurostat SBS/CPA, 2023. Based on CPA/NACE C29 motor vehicles, trailers and semi-trailers. This is a broad sector-level proxy for fluoropolymer-relevant automotive activity, not a targeted estimate of fluoropolymer-using applications.
E-mobility	121,200	Eurostat PRODCOM, 2024. Based on selected electric and hybrid passenger vehicle categories. This provides a targeted estimate of e-mobility manufacturing output linked to fluoropolymer use but excludes imports.
Semiconductors	17,532	Eurostat PRODCOM, 2023. Based on a central semiconductor product set; targeted semiconductor manufacturing estimate.
Construction	2,472,612	Eurostat NACE, 2024. Based on NACE F41–43 construction sector data. This represents the total reported size of the construction sector, used as a broad context proxy for fluoropolymer-relevant activity. Fluoropolymers are used in selected construction applications such as roof/façade coatings, bearings, greenhouse films and PTFE thread sealings, but the estimate is not limited to those applications.
Renewable energy	13,872	Eurostat PRODCOM, 2024. Based on selected renewable-energy equipment categories. This provides a targeted but not exhaustive estimate of renewable-energy manufacturing output linked to fluoropolymer use but excludes imports.
Advanced medical applications	12,339	Eurostat PRODCOM, 2024. Based on selected advanced medical manufacturing categories. This provides a targeted estimate of medical manufacturing output linked to fluoropolymer use, although some included diagnostic equipment categories are broader.

Output values are reported in € million and rounded to the nearest € million. Estimates use the most relevant available Eurostat source for each sector. PRODCOM figures capture sold production for selected product categories and are therefore narrower, product-specific estimates that

exclude imports. CPA/NACE figures capture turnover or sector-level activity for broader sectors or categories; these are wider in scope and may include sales of imported goods where relevant but are not targeted estimates of fluoropolymer-using activity.

The table illustrates the scale difference between fluoropolymer supply and the downstream sectors in which fluoropolymers are used. These differences are reflected in the value-at-risk analysis through the activity-share and criticality assumptions applied to the relevant downstream denominators.

4.3 Results under the baseline no-derogation scenario

The results below estimate downstream economic activity exposed under the baseline no-derogation scenario. They should be interpreted as measures of value at risk, rather than forecasts of losses. The results are presented for transport, energy and sealing applications. As set out above, sealing applications are cross-cutting and should therefore be interpreted alongside, rather than added mechanically to, the sector estimates.

The value-at-risk analysis is based on downstream economic denominators – such as transport manufacturing, energy technologies and semiconductor-related production – and on assumptions about the share of those activities that depend on fluoropolymer applications, developed from the responses from manufacturers. The downstream value at risk does not depend directly on whether the fluoropolymer inputs used by downstream firms are produced in the EU27 or imported. The baseline scenario concerns restricted access to fluoropolymer applications in the EU market, rather than the origin of the fluoropolymer supply. What matters for the exposure calculation is the scale of the downstream activity and the extent to which that activity is dependent on fluoropolymers in the short run.

This means that the market-sizing evidence in Section 3.1 provides important context for interpreting the results, rather than a separate basis for estimating downstream exposure. The market-sizing analysis indicates that EU downstream users rely on a combination of EU-produced and imported fluoropolymer supply. The results in this section therefore capture the scale of downstream EU activity potentially exposed where continued access to fluoropolymers is constrained, regardless of whether the current supply is domestic or imported.

4.3.1 Transport

Transport represents the largest quantified downstream exposure. Fluoropolymers are used in applications linked to road vehicles, aerospace, rail and maritime equipment, including components operating under demanding thermal, chemical, mechanical or safety-critical conditions. Manufacturer evidence indicates high criticality across several transport applications, reflecting limited short-run substitution options and the need for performance, durability and regulatory compliance in final products.

The transport estimate is based on SBS data for relevant transport manufacturing sectors. Activity-share assumptions are used to identify the portion of sector output exposed to fluoropolymer-dependent applications, while criticality assumptions reflect the manufacturer evidence on substitutability.

Table 4.4: Total transport value at risk under baseline no-derogation scenario

Impact Metric	Low	Central	High
Output at risk (€m)	190,000	330,000	520,000
GVA at risk (€m)	43,000	77,000	120,000
Employment at risk (FTE)	405,400	727,100	1,129,500

Monetary values are reported in € million and rounded to two significant figures. Employment is reported in full-time equivalents (FTE) and rounded to the nearest 100.

In the central case, approximately **€330 billion of transport output, €77 billion of GVA and 727,100 FTE jobs** are exposed. The largest exposure is in road vehicles, with additional exposure in aerospace, rail and maritime applications.

4.3.2 Energy

Energy-related applications include PV products, hydrogen technologies, lithium-ion batteries for non-EV uses, and chlor-alkali membranes. These applications are relevant to clean technology value chains, industrial decarbonisation and energy-system resilience.

The modelling uses product-level PRODCOM data for PV and lithium-ion batteries, where product-level data provide a better denominator than broad or confidential SBS business sectors. For hydrogen technologies and chlor-alkali membranes, SBS sectors are used with activity-share assumptions to isolate the relevant downstream activity. Criticality varies by application. PV applications are generally assessed as difficult to substitute, while hydrogen technologies, batteries and chlor-alkali membranes are generally assessed as highly critical based on manufacturer evidence.

Table 4.5: Total Energy Value at Risk under Baseline No-Derogation Scenario

Impact Metric	Low	Central	High
Output at risk (€m)	3,700	9,000	16,000
GVA at risk (€m)	1,200	2,900	5,000
Employment at risk (FTE)	9,900	25,000	43,700

Monetary values are reported in € million and rounded to two significant figures. Employment is reported in full-time equivalents (FTE) and rounded to the nearest 100.

In the central case, energy-related applications account for approximately **€9.0 billion of output, €2.9 billion of GVA and 25,000 FTE jobs** exposed. While this is smaller than the transport exposure, the affected applications are strategically important because they are linked to clean technology, hydrogen production, battery storage and core industrial chemical processes.

4.3.3 Sealings

Sealings are treated as a cross-cutting application group rather than a single downstream sector. Fluoropolymer sealings are used in transport, energy, semiconductor and wider industrial applications, often where chemical resistance, reliability and durability are required under demanding conditions. These results should be interpreted carefully because sealing applications overlap with the transport and energy estimates.

Semiconductor sealings are modelled using PRODCOM semiconductor product values, excluding PV products to avoid double-counting with the energy analysis. Transport and energy sealings are modelled using the same underlying downstream data as for each of those sectors in the previous two sub-sections.

Table 4.6: Total Sealings Value at Risk under Baseline No-Derogation Scenario

Impact Metric	Low	Central	High
Output at risk (€m)	8,000	20,000	36,000
GVA at risk (€m)	2,000	5,100	8,800
Employment at risk (FTE)	23,000	54,900	94,800

Monetary values are reported in € million and rounded to two significant figures. Employment is reported in full-time equivalents (FTE) and rounded to the nearest 100.

In the central case, sealing applications are associated with approximately **€20 billion of output, €5.1 billion of GVA** and **54,900 FTE jobs** exposed. These results illustrate the potential scale of downstream activity linked to high-performance sealing applications, particularly where manufacturer evidence indicates that substitution is difficult or not technically viable in the short run.

4.4 Strategic sectors, transversal applications and production viability

The value-at-risk results are relevant to the EU's wider objectives on competitiveness, economic security and strategic autonomy. The results indicate that fluoropolymers are not only inputs into fluoropolymer manufacturing supply chains, but also enabling materials for downstream sectors that are strategically important to the EU. This is consistent with the EU's current policy focus on strengthening industrial resilience, supporting the clean transition, reducing strategic dependencies and maintaining capability in advanced technologies.

The policy relevance of the results differs by application. In transport, the exposure relates to one of the EU's largest industrial ecosystems, including road vehicle, aerospace, rail and maritime manufacturing. The European Commission has identified the car industry as a vital part of the EU economy, providing 13 million jobs and contributing 7 per cent of EU GDP,⁵ and its Automotive Action Plan places emphasis on competitiveness, clean mobility and supply-chain resilience.⁶ The transport results therefore matter not only because they are large in quantitative terms, but because disruption to key enabling inputs could affect value chains that the EU is actively seeking to keep competitive during the transition to low- and zero-emission mobility.

In energy, the quantified exposure is smaller than in transport, but the strategic significance is high. The affected applications include photovoltaic products, hydrogen technologies, non-EV lithium-ion batteries and chlor-alkali membranes. These are linked directly to clean technology deployment, energy-system resilience and industrial decarbonisation. This aligns with the Net-Zero Industry Act,⁷ which aims for EU manufacturing capacity for strategic net-zero technologies to approach or reach at least 40 per cent of annual deployment needs by 2030, and which identifies technologies including solar photovoltaic, electrolysers and fuel cells, and batteries and storage. It also aligns with the Clean Industrial Deal, which frames clean-tech manufacturing and industrial decarbonisation as central to EU competitiveness.⁸

Sealing applications add a further strategic dimension because they are embedded across multiple downstream sectors. High-performance fluoropolymer seals, gaskets, O-rings and related components are used in applications where reliability, chemical resistance and durability are required under demanding operating conditions. The semiconductor-related sealing results are particularly relevant because they relate

⁵ European Commission (2025) "Boosting the European car sector" [[online](#)]

⁶ European Commission (2025) "Commission boosts European automotive industry's global competitiveness" [[online](#)]

⁷ European Commission "Net-Zero Industry Act" [[online](#)]

⁸ European Commission "Clean Industrial Deal" [[online](#)]

to a sector in which the EU has explicit objectives to strengthen its technological leadership and reduce reliance on third countries. The European Chips Act is intended to build up the EU semiconductor ecosystem, including design, manufacturing and packaging of advanced chips, and to support the Digital Decade target of doubling the EU's global market share in semiconductors to 20 per cent.⁹

These links to EU policy objectives do not mean that all downstream activity identified in the value-at-risk analysis would be lost under the proposed restrictions. The estimates should remain understood as measures of exposure. However, they show that the potential effects of restricting fluoropolymer applications would not be limited to the direct fluoropolymer market. Where fluoropolymers perform technically enabling functions, restrictions could create bottlenecks in downstream value chains, increase uncertainty for manufacturers, or shift reliance towards non-EU sources of materials, components or finished products.

This is relevant to the proportionality assessment. The EU's Economic Security Strategy identifies risks to supply-chain resilience, critical infrastructure, technology security and the weaponisation of economic dependencies as priority areas.¹⁰ The Competitiveness Compass similarly identifies decarbonisation and reducing dependencies as central requirements for restoring EU competitiveness.¹¹ In this context, the key issue is not simply whether fluoropolymer sales are large or small in absolute terms, but whether access to fluoropolymer applications supports downstream capabilities that the EU considers strategically important. Indeed, derogations for individual selected strategic uses — for example defence, aerospace or other critical applications — may not alone be sufficient to preserve the EU fluoropolymer supply base. Some strategic uses of transversal fluoropolymer applications, such as sealings and lubricants, may account for relatively small volumes which alone may not be enough for production to be economically viable (i.e. there's a minimum production volume below which manufacturing fluoropolymers is not viable). If restrictions remove a substantial share of the wider demand base EU production could become less viable even where narrowly selected strategic uses are formally derogated. The consequence could be that critical downstream sectors in the EU become increasingly dependent on non-EU supply of finished / semi-finished goods containing fluoropolymers, despite the EU's intention in providing a derogation.

Overall, the results suggest that the proposed restriction should be assessed in light of both direct and downstream effects. In sectors such as transport, clean energy technologies and semiconductors, the relevant risk is that a restriction on a relatively small but technically enabling input could have wider implications for value chains that support EU competitiveness, decarbonisation and resilience.

4.5 Implications of a derogation-based approach

The baseline no-derogation results show the scale of downstream activity exposed if fluoropolymer applications are restricted and no derogations apply. In practice, the proposed restriction includes derogations or alternative controlled-use approaches for some applications. The relevant question is therefore whether those derogations are sufficient to preserve the economic and strategic benefits identified in the previous chapters.

We use manufacturer input, supplemented by review of the proposed derogation framework, to inform assumptions for the share of relevant fluoropolymer sales value that remains restricted.¹² The derogation-adjusted value at risk is calculated by applying the relevant residual restricted share to the baseline no-derogation output, GVA and employment estimates.

The assumptions are that 50 per cent of relevant transport fluoropolymer sales value remains restricted, 90 per cent of relevant energy sales value remains restricted, and 100 per cent of relevant sealing sales value

⁹ European Commission “The EU budget bolsters Europe's technological leadership: the European Chips Act” [[online](#)]

¹⁰ European Commission “An EU approach to enhance economic security” [[online](#)]

¹¹ European Commission, Competitiveness Compass [[online](#)]

¹² European Chemicals Agency (ECHA) “SEAC Draft Opinion on PFAS restriction proposal” [[online](#)]

remains restricted. These assumptions reflect the relatively narrow or uncertain coverage of the derogation framework, particularly for cross-cutting and energy-related fluoropolymer applications.

Table 4.7: Derogation-adjusted downstream value at risk

Area	Central baseline output at risk	Residual restricted share	Derogation-adjusted output at risk	Derogation-adjusted GVA at risk	Derogation-adjusted employment at risk
Transport	€330bn	50%	€165bn	€39bn	364,000 FTE
Energy	€9.0bn	90%	€8.1bn	€2.6bn	22,500 FTE
Sealings	€20bn	100%	€20bn	€5.1bn	54,900 FTE

The results are based on central baseline value-at-risk estimates. Sealings are a cross-cutting application category and should be interpreted alongside, rather than added mechanically to, the transport and energy estimates. Monetary values and employment are rounded.

The results should be interpreted as a **short-term derogation coverage assessment**. They do not account for the expiry of time-limited derogations, uncertainty over the final legal scope of the restriction, or the operational feasibility of supplying only derogated uses. As a result, even where the short-term residual restricted share is materially reduced, derogations may still be too fragmented, uncertain or administratively complex to preserve the economic and strategic benefits identified in the preceding chapters.

Applying these residual restricted shares to the central baseline value-at-risk estimates gives an indication of the scale of value that could remain exposed even after derogations are taken into account. For transport, the derogation case implies that around **€165 billion of output, €39 billion of GVA and 364,000 FTE jobs** could remain at risk. For energy, the equivalent estimates are approximately **€8.1 billion of output, €2.6 billion of GVA and 22,500 FTE jobs**, while for sealings the figures are the same as the baseline scenario.

Overall, the derogation adjustment indicates that material downstream value could remain at risk under a derogation-based approach.

4.6 What these results show

The downstream analysis shows that the economic significance of fluoropolymers extends beyond the direct value of fluoropolymer sales. In the central baseline no-derogation scenario, fluoropolymer applications are associated with approximately €330 billion of transport output, €9 billion of energy-related output and €20 billion of sealing-related output exposed. The corresponding GVA exposures are approximately €77 billion, €2.9 billion and €5.1 billion, respectively.

These estimates are best interpreted as measures of downstream exposure. They identify the scale of economic activity associated with applications where fluoropolymers perform enabling functions and where short-run substitution may be difficult or not viable. They are not forecasts that this activity would necessarily be lost in full. The results nevertheless show that the potential economic relevance of fluoropolymers cannot be inferred from fluoropolymer sales values alone.

The transport results account for the largest quantified exposure, reflecting the scale of EU transport manufacturing and the use of fluoropolymer applications in components subject to demanding performance, durability, safety and regulatory requirements. The energy results are smaller in aggregate, but are strategically important because they relate to clean technology deployment, hydrogen production, battery storage and industrial chemical processes. The sealing results should be interpreted separately and with care, because sealing applications are cross-cutting and overlap with some transport and energy uses. They nevertheless illustrate the importance of high-performance sealing applications, including in semiconductor-related uses where overlaps with the transport and energy estimates are more limited.

The overall implication is that fluoropolymers should be assessed as enabling inputs within wider industrial value chains. For the proportionality assessment, the relevant question is not only the direct footprint of fluoropolymer manufacturing, but also the downstream activity and strategic capabilities that may depend on continued access to fluoropolymer applications. This is particularly important where substitution options are limited in the short run and where affected applications support EU objectives on competitiveness, decarbonisation, advanced manufacturing and supply-chain resilience.