



PlasticsEurope
Operation Clean Sweep®

REPORT 2019

PlasticsEurope
Association of Plastics Manufacturers

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PlasticsEurope is the pan-European association of plastics manufacturers with centres in Brussels, Frankfurt, London, Madrid, Milan and Paris.

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PLASTIC PELLET LOSS PREVENTION IS A MAIN PILLAR OF OUR SUSTAINABILITY STRATEGY. OUR COMMON GOAL IS TO ELIMINATE ALL LOSS OF PELLETS TO THE ENVIRONMENT.

Dr Markus Steilemann

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Foreword

It is my great pleasure to present the 2019 Operation Clean Sweep® (OCS) report, especially in light of the fact that 2019 was a milestone year for the programme. The report highlights the many achievements and continued progress we are making in implementing new and improved best practices to prevent pellet loss in the environment.

After a voluntary acceptance of the pledge to OCS from member companies during 2018, PlasticsEurope changed its Statutes in June 2019, citing that all member companies should adhere to the OCS programme¹, making it the first trade association to do this. We consider this as a major step forward in the implementation of the OCS programme, and are confident of this strong signal to help trigger the implementation of the OCS programme by the plastics value chain. This, of course, is an integral part of Plastics 2030 – PlasticsEurope’s Voluntary Commitment to increase circularity and resource efficiency.*

In addition to making OCS compulsory for all its members, PlasticsEurope has further committed to accelerate and strengthen the OCS programme by working with the plastics value chain in developing an OCS certification scheme. In practice, this means developing common requirements derived from the six pillars of the OCS pledge. In future, companies will be audited regularly by accredited third parties to transparently and jointly demonstrate efforts towards zero pellet loss into the environment.

We strongly believe it is critical to implement OCS across the whole plastics value chain to solve the global issue of pellet loss.

Dr Markus Steilemann
CEO of Covestro
President of PlasticsEurope

* The plastics value chain includes production, handling, transportation, logistics operators, conversion and recycling.



“

**PLASTICSEUROPE CONSIDERS
ANY PLASTIC LEAKAGE INTO THE
ENVIRONMENT AS UNACCEPTABLE.**

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Report summary

In 2015, PlasticsEurope joined the global initiative “Operation Clean Sweep®” (OCS), which aims at achieving zero pellet* loss. This report highlights progress made in 2019.

As the main host of the programme in Europe, PlasticsEurope is coordinating its implementation by encouraging the entire plastics value chain, be it member companies, logistics providers, transporters, converters or recyclers to join the programme – to date, close to 700 stakeholders have signed OCS.

During 2019, PlasticsEurope strengthened its commitment to pellet loss containment even further by making the OCS programme compulsory to all its members.

OCS is also a key component of PlasticsEurope’s Voluntary Commitment “Plastics 2030”. There too, important progress was made in 2019:

- 100% of PlasticsEurope member companies have become OCS signatories;
- All members completed the annual OCS questionnaire on their level of implementation at production facilities;
- Three additional major European ports handling plastic pellets (Tarragona, Cartagena, Felixstowe) have joined the programme.

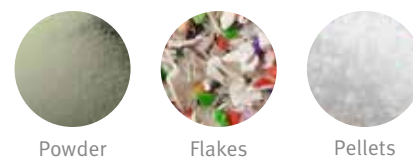
We have identified short, medium and long-term targets to continue pushing the plastics value chain to join the OCS programme and implementing zero pellet loss best practices. In 2019, PlasticsEurope has started developing OCS requirements with the full value chain. A process that is still ongoing until this day. It creates the baseline for the OCS certification scheme which will be fully operational by 2022, with the aim of all PlasticsEurope member companies having been externally audited by 2025.

PlasticsEurope will continue reporting annually on progress made in the fight to end pellet loss.

* The term pellet covers either resin pellet, flake and powder.

2

Plastic pellets in the environment



In Europe, the majority of plastics raw materials take the form of either round or oval granules of approximately 2-5 mm in diameter, known as pellets or powder (< 1 mm). Flakes consist of mixed plastics materials of various sizes, produced through the recycling of plastics waste.

In response to public concern over wildlife and human exposure to microplastics, numerous scientific studies are being carried out to assess the magnitude of this problem. A 2019 study by the Science Advice for Policy by European Academies (SAPEA)³ observed that microplastics are found in different concentrations across diverse environmental compartments, accumulating in marine and coastal areas, in freshwater environments and ecosystems.

While the deterioration of larger plastic items into microplastics often contributes more to marine litter than pellet loss, there is now growing evidence that pellets are also found in large quantities in the marine and terrestrial environments. According to a 2018 study by Eunomia, plastic pellets are estimated to be the second largest source of microplastics entering the aquatic environment in the EU, with an annual median emission of 41,000 tonnes (ranging from 3,000 to 78,000 tonnes).⁴

The Plastic Leak Project, a multi-stakeholder initiative co-founded by Quantis, also developed a methodology to map, measure and forecast plastic leakage through the whole life cycle of products, including pellets, and identify their pathways into the environment.⁵

Concerning losses along the plastics value chain, a background document on pre-production pellets compiled by the OSPAR Commission assessed that estimated total pellets losses in Europe amount to between 16,888 tonnes and 167,431 tonnes per year.⁶ It is important to note, however, that estimates vary as to the exact magnitude of the problem, since there is currently no standardised methodology to measure pellets flow and losses at industrial sites.

As part of its monitoring and assessment programme, OSPAR also works on the development of environmental

quality indicators for the North Sea, measuring plastic particles ingestion by different marine species. The results of the OSPAR monitoring programme on the accumulation of plastics in the stomachs of Northern fulmars found that 93% of these seabirds had ingested plastics. However, the current 2007-2016 analyses show significant declines in both the ingested plastic mass ($p < 0.001$) and the annual percentage of birds with over 0.1g of plastic ($p = 0.002$).⁷ These results show an encouraging positive decreasing trend but greater efforts towards plastic pellets containment remain necessary to achieve good environmental status in different European geographical areas.

To sum up, the fight against pellet loss in the environment must be scaled-up, along with ongoing industrial efforts to tackle the problem at source. This calls for additional and coordinated actions in the implementation of the OCS programme by plastics producers and the entire value chain.

DEFINITION

Microplastics are commonly understood to be solid, insoluble, man-made plastic/rubber particles that are under 5 mm in size. Yet, no internationally recognised definition of “microplastic” exists².

Primary microplastics are released into the environment as small plastic particles, whereas secondary microplastics are a result of the breakdown of larger articles (e.g. mismanaged plastic waste).

Plastic particles in fulmar (seabird) stomachs in the North Sea



- FAROE ISLANDS
- ICELAND
- SVALBARD
- NORTH-NORWAY
- SOUTH EAST-NORTHSEA
- SCOTTISH ISLANDS
- CHANNEL
- EAST-ENGLAND
- SKAGERRAK

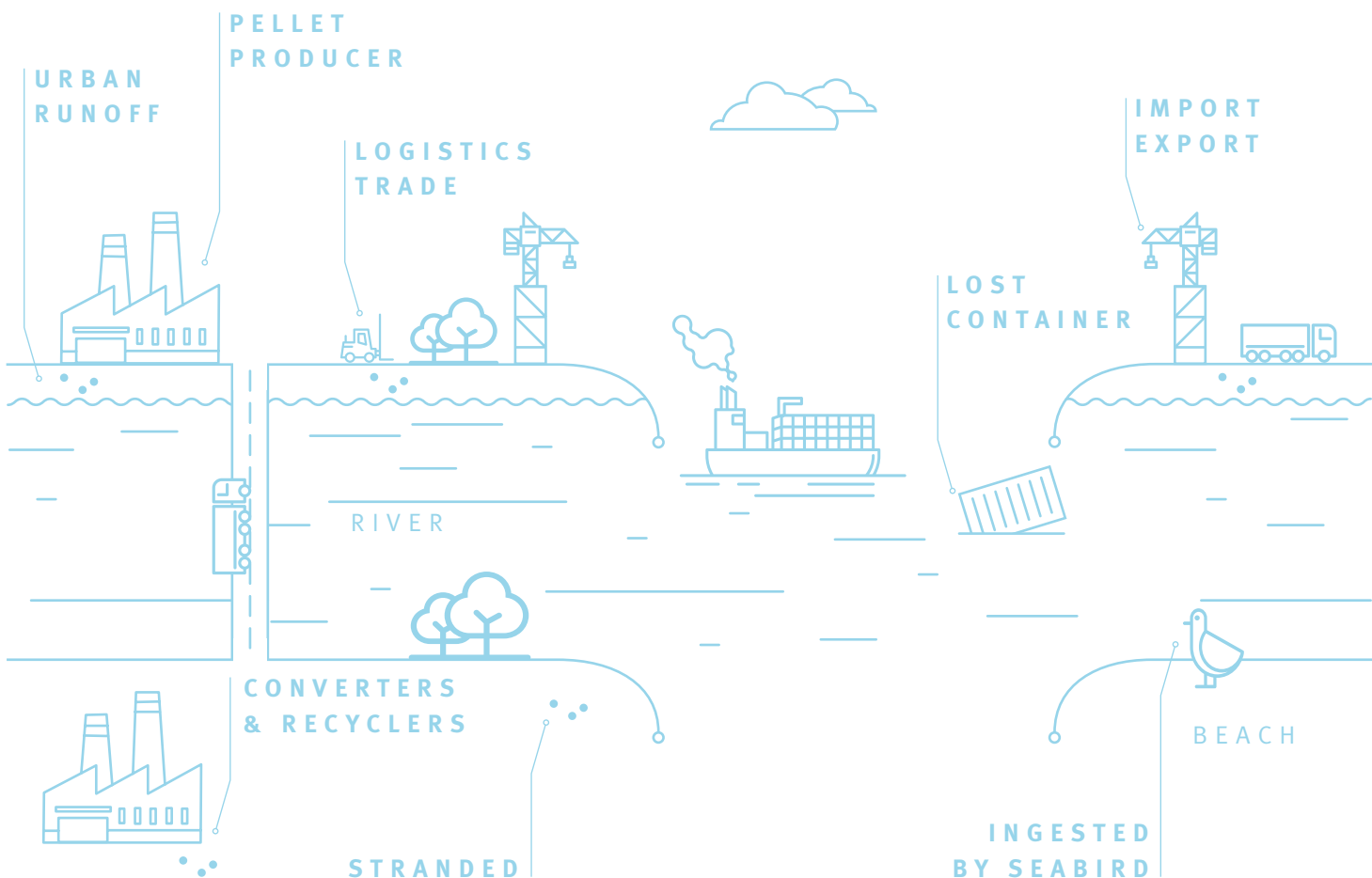
Running five-year averages for the percentage of fulmars having more than 0.1 g of plastic in the stomach since 2000 and/or the start of sub-regional participation in the monitoring programme.⁸

3

Sources of pellet spills

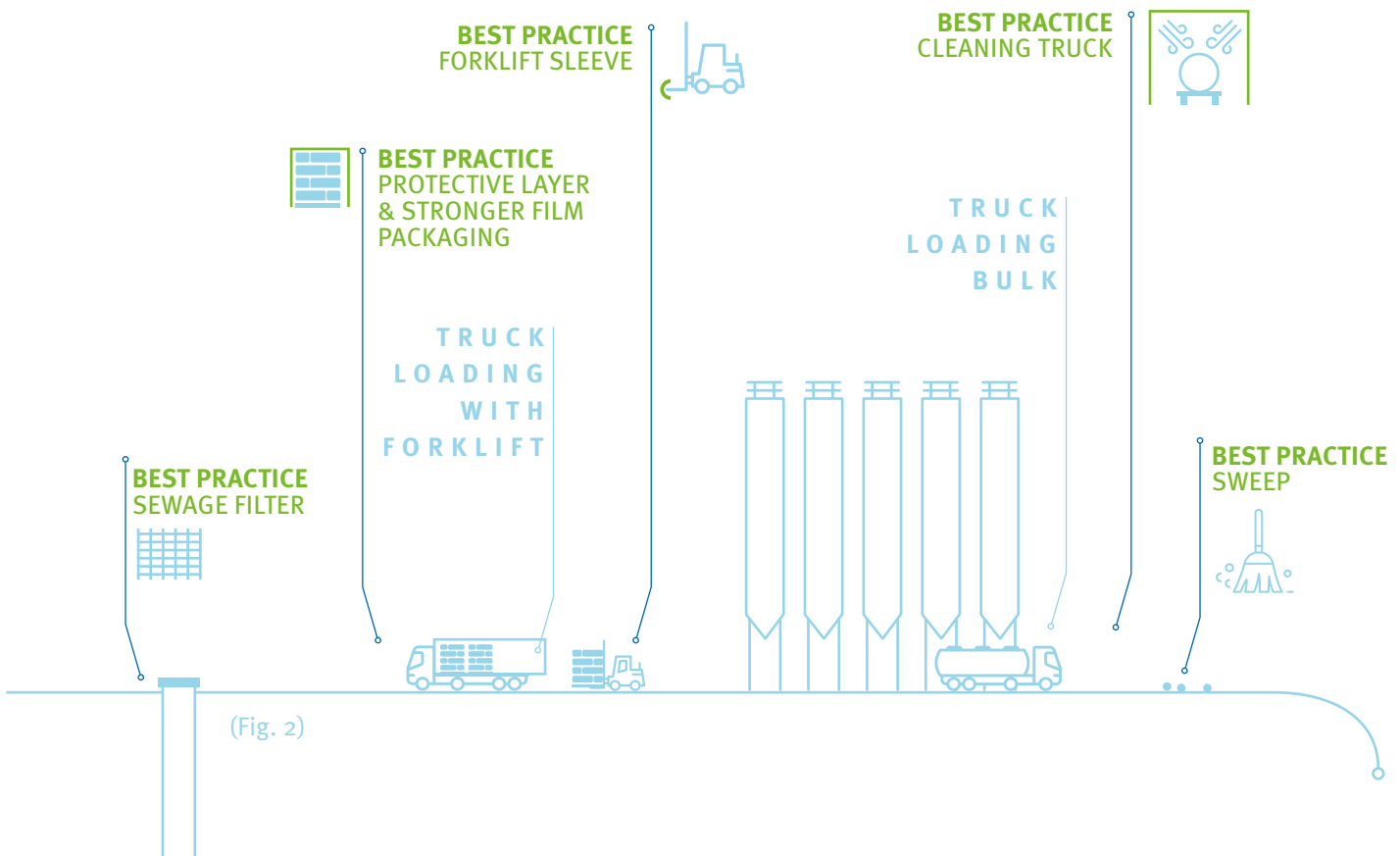
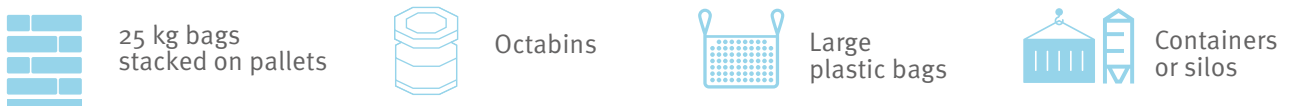
The typical route for pellets starts at a production facility. Pellets are then packaged either for storage or for transportation to plastics converters or other customers e.g. via logistics hubs. The type of packaging must be carefully selected based on customer needs, mode of transport and compliance with safety requirements in accordance with industry standards (e.g. food and healthcare requirements). There are four main types of packaging used: 25 kg bags stacked on pallets, octabins (large carton boxes), “big bags” (large plastic bags), containers or silos (Fig. 1).

Pellets can be transported between different actors along the value chain mainly by road, rail or sea. Converters then receive the pellets in either of the packaging types described above. The pellets are fed into heat extruders or injection moulding machines, to be melted and formed into parts, pipes or other finished goods. In some cases, pellets are not directly sold to converters by the producers. Trading companies and distributors may buy pellets in large quantities and store them in warehouses for re-sale in smaller quantities to converters. During mechanical recycling of plastic goods, most plastic waste is transformed into similar raw materials such as pellets or flakes. These materials will follow the same cycle.



Whilst high environmental, safety and quality management controls are applied throughout the plastics industry, unintentional loss of pellets can occur at different stages along the value chain (Fig. 2). Spills which occur in closed areas with no possible route into the environment will be contained. However, when spillages occur outside of a closed area, pellets may end up being washed down drains and into waterways before eventually flowing into the ocean. This can lead to severe environmental and social impacts. It is therefore important for all workers handling pellets to be trained to quickly react and take the appropriate measures in order to contain these spills. Pellets loading and unloading operations account for the highest risk of loss at all stages of the value chain.

4 main types of packaging used (Fig. 1)



4

Operation Clean Sweep®

In 2013, PlasticsEurope created Zero Pellet Loss (ZPL) to engage the value chain further by increasing stakeholder focus on the issue and highlighting pellet containment as a priority. In 2015, to align and concentrate global industry efforts under a common approach, the ZPL initiative was integrated into Operation Clean Sweep® – a programme developed in the early 1990s by the Plastics Industry Association (PLASTICS, formerly SPI) in the USA. Since then, PlasticsEurope has become the main host of the OCS programme in Europe and actively encourages pellet-handling companies (as well as other associations from the value chain) to commit to the programme and prioritise its implementation across all industrial sites.

4.1 The six commitments of OCS in Europe

By signing the European OCS pledge (see p.26), each pellet-handling company recognises the importance of preventing spillages into the environment and commits to the following six actions:

1. Improve worksite set-up to prevent and address spills
2. Create and publish internal procedures to achieve zero industrial plastic material loss
3. Provide employee training and accountability for spill prevention, containment, clean-up and disposal
4. Audit performance regularly
5. Comply with all applicable state and local regulations governing industrial plastics containment
6. Encourage partners (contractors, transporters, distributors, etc.) to pursue the same goals.

The programme provides recommendations in the form of a manual on how to deliver against each of the six actions. This manual is based on collective learning and aims to support companies to achieve excellence in implementing the necessary measures, in accordance with their own specific set-up. Tools such as customisable checklists for both employees and managers to conduct site and equipment audits and OCS promotion materials such as posters, videos and flyers are also available. Additionally, each company can receive an OCS participation certificate upon request. Signed pledges are centrally filed at PlasticsEurope and signatories are officially listed on the OCS website.

The six commitments of OCS in Europe

1

IMPROVE WORKSITE SET-UP TO PREVENT AND ADDRESS SPILLS



CREATE AND PUBLISH INTERNAL PROCEDURES TO ACHIEVE ZERO INDUSTRIAL PLASTIC MATERIAL LOSS



2



3

PROVIDE EMPLOYEE TRAINING AND ACCOUNTABILITY FOR SPILL PREVENTION, CONTAINMENT, CLEAN-UP AND DISPOSAL



AUDIT PERFORMANCE REGULARLY



4



5

COMPLY WITH ALL APPLICABLE STATE AND LOCAL REGULATIONS GOVERNING INDUSTRIAL PLASTICS CONTAINMENT



ENCOURAGE PARTNERS (CONTRACTORS, TRANSPORTERS, DISTRIBUTORS, ETC.) TO PURSUE THE SAME GOALS.



6





2013

- PlasticsEurope creates this initiative to engage the value chain in pellet loss containment

2014

- PlasticsEurope becomes the main host of Operation Clean Sweep® in Europe

2017

- The Port of Antwerp is the first to sign-up to OCS in Europe



2018

- **PlasticsEurope launches its Voluntary Commitment (Plastics 2030), making pellet loss prevention a priority**
- OCS questionnaire is developed to measure industry progress
- PD Ports (Teesside, UK) signs up to OCS

2019

- OCS becomes compulsory for PlasticsEurope members
- An OCS certification scheme with external audit is under development
- Common assessment tool under development
- The ports of Tarragona (ES), Cartagena and Felixstowe (UK) sign-up to OCS
- PlasticsEurope achieves the target of 100% OCS signatories amongst its membership

See “Outlook” p. 24

5

Achievements and best practices in Europe

5.1 Number of signatories in Europe⁹

By the end of 2019, almost 700 companies and associations along the entire plastics value chain in Europe had joined the OCS programme (Fig. 3). It represents an increase of 40% compared to the previous year. Logistics (+103) and converters (+43) are the sectors with the highest of new signatories.

Amongst the plastics raw material producers, signatories include all the 52¹⁰ PlasticsEurope member companies (Table 01) to which OCS is applicable. This is the result of PlasticsEurope decision to make OCS compulsory for its membership as of 1st January 2020¹¹.

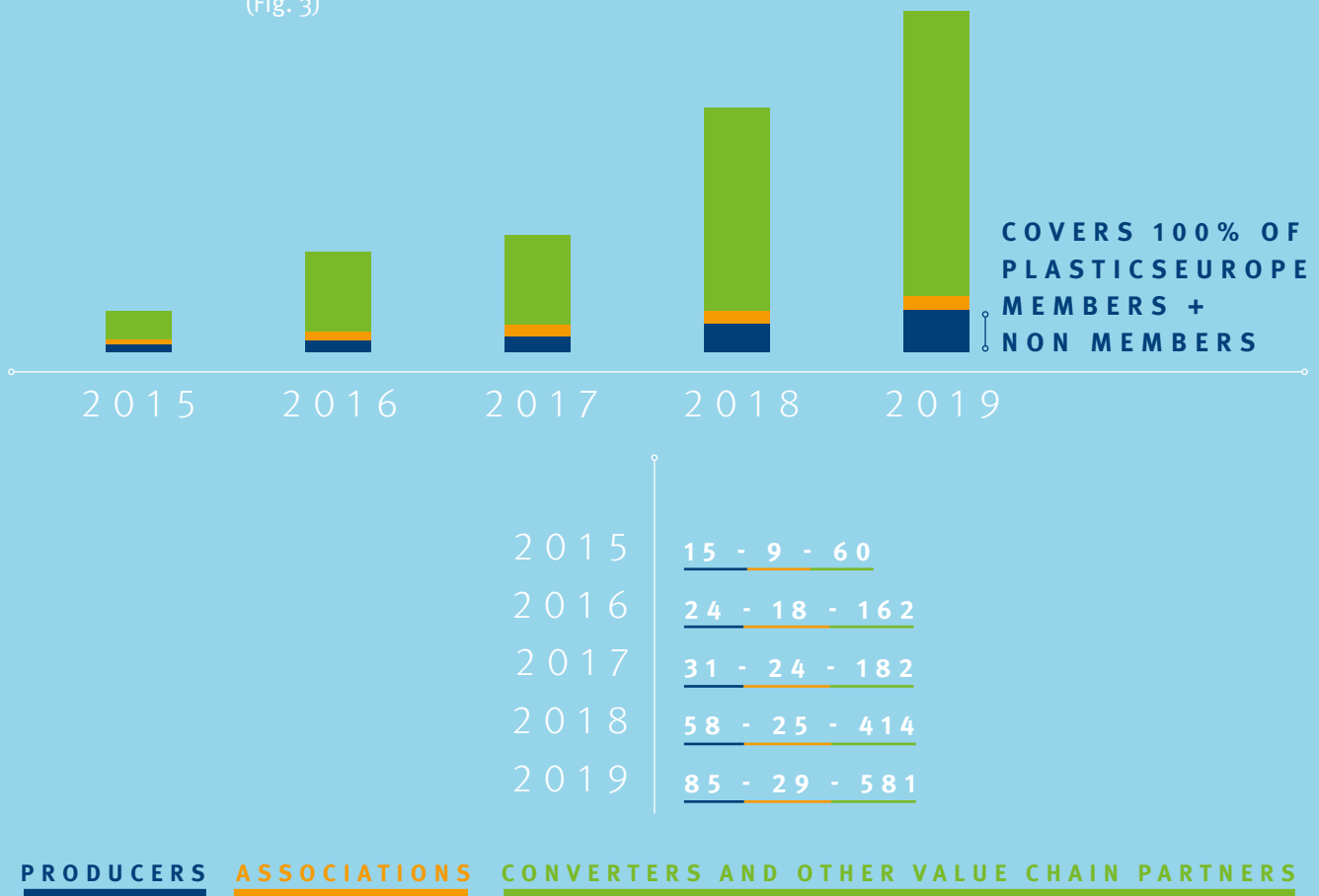
In addition to the Port of Antwerp in Belgium and PD Ports in the UK, in 2019 the Ports of Cartagena and Tarragona, both located in Spain, have signed up to OCS. In the same year, the Port of Felixstowe has become the second Port Authority to sign the OCS pledge in the UK.

¹⁰ Amongst 56 PlasticsEurope members, OCS was applicable to 52 companies in 2019. Since 2020, two new members have joined the association recently.



Number of OCS signatories in Europe

(Fig. 3)



5.2 Initiate the development of an OCS certification scheme in Europe

In order to further accelerate and strengthen the OCS programme, PlasticsEurope has committed to initiate the development of an OCS certification scheme with third party auditing. The OCS certification scheme enables the plastics industry and all value chain handlers of pellets to transparently and jointly demonstrate their efforts towards zero pellet loss into the environment. PlasticsEurope believes that this approach is the most effective and efficient approach to achieve zero plastic pellet loss.

This is also fully in line with future measures and actions to curb microplastics pollution proposed in the EU Plastic Strategy which was published in 2018 – development of measures to reduce plastic pellet spillage (e.g. certification scheme along the plastic supply chain and/ or Best Available Techniques reference document under the Industrial Emissions Directive). The OCS certification scheme sets common requirements (based on the six pillars of the OCS pledge) that will be audited regularly by accredited third parties. PlasticsEurope is currently working with the full plastics value chain on the development of this OCS certification scheme in view to have it ready by 2022.

5.3 Results of the OCS questionnaire 2019

Every year, industry progress on OCS implementation is measured using a transparent and harmonised scheme. Results are communicated to European institutions and key stakeholders through the OCS Report. Pursuant to its 2030 Voluntary Commitment, PlasticsEurope has developed in 2018 the first OCS questionnaire to track the advancement of its member companies towards zero pellet loss. The initial questionnaire has been reviewed by the NGO Flora & Fauna and is updated on an annual basis according to stakeholders' feedback.

In 2019, the OCS questionnaire was completed by 100% of PlasticsEurope member companies that had pledged to the OCS programme when the questionnaire was launched (July 2019). PlasticsEurope member companies that committed to OCS after this date would respond to the questionnaire in 2020. Overall, the results are representative of around 200 facilities operated by 44 of PlasticsEurope members with production sites in Europe, where OCS is applicable. These production facilities are located in 18 countries across Europe (including Russia and Turkey).

Improve worksite set-up to prevent and address spills

The findings of the 2019 OCS questionnaire show that the majority of respondents have implemented measures and/or actions to improve worksite conditions to prevent and/or clean-up losses. The majority of companies (97%) have analysed the sources of potential pellet spills at their facilities and identified that loading and unloading areas, process and mixing points are the three main locations where pellets losses occur more often at different sites. In response to this, 94% of respondents have implemented measures and/or actions to improve their worksites and around 89% of the facilities have developed a concrete action plan to address (potential) pellet losses.

The availability of cleaning points, tools, and of electric sweepers at site are a few examples of the best practices that many OCS signatories have reported for the improvement of their worksites.

Internal procedures towards eliminating pellet loss

The results show that the majority of facilities have in place internal procedures to address pellet spills. Most respondents reported the establishment of qualitative pellet loss reduction goals in their environmental management system (EMS) and, compared to 2018 data, an increasing number of facilities (63%) have also established quantitative targets. Overall, 85% of facilities considered that the implementation of the OCS programme had had a positive impact on their operational pellet management. They indicated increased employee awareness, support from top management and better availability of appropriate cleaning tools (e.g. street sweepers, vacuums, shovel) as examples of improved pellet management.

Employee training and accountability

OCS is part of a periodic training programme for employees in around 61% of the enquired facilities. Training are organised, mostly with an annual frequency, to raise employee awareness of pellet handling and containment. Among the facilities that conduct periodic trainings, the majority reported that around 100% of employees receive training on OCS.

Audit performance

Around 90% of respondents reported carrying out periodic inspections at their facilities to verify their performance on OCS. Examples of inspections include supervisor walkthroughs, internal audits and self-assessment. In addition to this, OCS is part of an external management certification (e.g. ISO14001, ISO 9001 and EMAS) in around 36% of all surveyed facilities.



Compliance with applicable national or local regulations

In Europe there are neither national nor local regulations that specifically address pellet containment and loss.

Encourage value chain partners to join OCS

Most facilities surveyed are actively engaging with their value chain partners on the promotion of OCS, encouraging them to sign-up to the programme through dialogue, letters or by meeting them and sharing their experiences with OCS.

Why is there no uniform process for the implementation of OCS?

When it comes to pellet loss, there is no “one size fits all” solution. The size and technical set-up of production sites differ, and so do production and logistical processes. Also, companies may be on different levels regarding pellet containment and awareness of staff. Therefore, it is crucial that companies assess individually where and how risks of pellet loss occur and how these can be tackled. As of 2022, the plastics industry will be externally audited by accredited third parties in view to achieve 100% compliance with the programme.

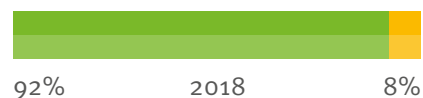
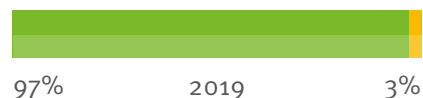
Conclusions

The OCS questionnaire is a practical and transparent tool to monitor and evaluate the progress of PlasticsEurope’s member companies towards achieving zero pellet loss. The results show that most of the companies that have committed to OCS have made progress on pellets, powder and flakes containment. Most facilities surveyed have taken actions to improve their worksite set-up, developed an action plan to address potential pellet spills into the environment and raised awareness among employees and partners over pellet loss prevention.

It is important to note that an increasing number of facilities have taken part in the 2019 OCS questionnaire. As these new respondents have only recently joined OCS, they are therefore at an early stage in the implementation of the programme. This explains the lower figures of 2019 compared to 2018. The next edition of this report will give a more representative picture of the implementation level as all PlasticsEurope’s members have now signed up to OCS and will be expected to report back.

Improve worksite set-up to prevent and address spills

Have you analysed sources of (potential) pellet spills at your facility?



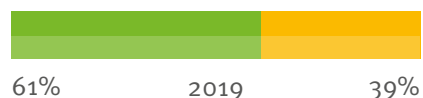
Internal procedures towards eliminating pellet loss

Has the implementation of OCS (related) goals had a positive impact on operational pellet management at your facilities?



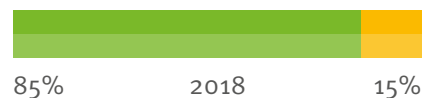
Employee training and accountability

Is OCS part of a periodic training programme?



Audit performance

Does your facility perform periodic inspection to verify your performance regarding OCS?



6

Highlights from across the globe

6.1 ACC metrics on pellet loss



Plastics Industry Association (PLASTICS) and the American Chemistry Council (ACC) invite companies to take their commitment – an annual pledge committing to OCS principles by plastics companies or plastics employees – to the next level with OCS blue. OCS blue is a new, datadriven VIP member offering available to current OCS members. The new member level will act as a recognition for companies excelling within the existing programme. OCS blue enhances the commitment to management, measurement, and reporting of unrecovered plastic releases into the environment from resin handling facilities.

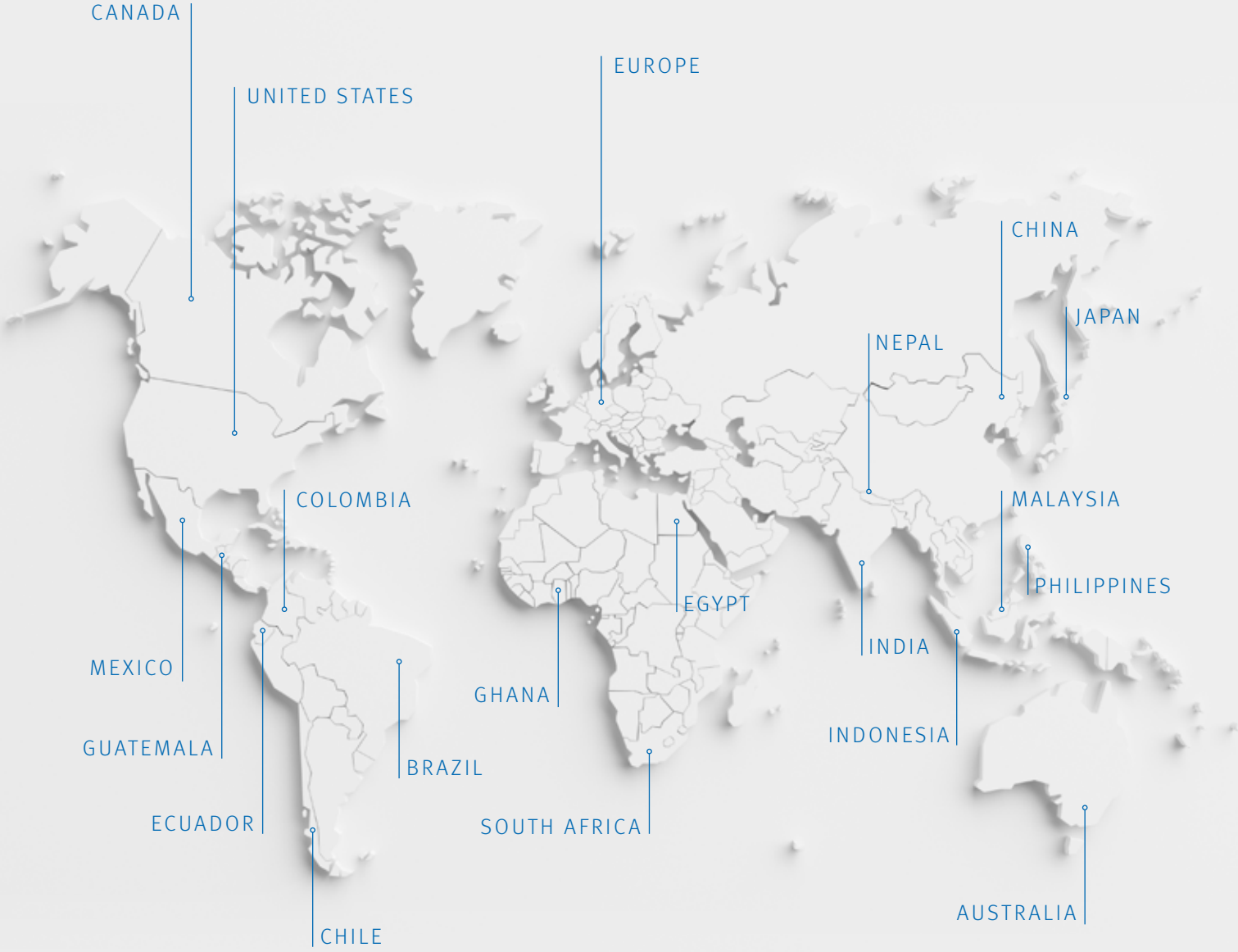
OCS blue member companies commit to the following:

- Metric Reporting – Companies must annually report metric data to PLASTICS or ACC
- Metric Data – Data to be reported annually includes the number and volume of incidents of any unrecovered release of plastic pellets, flakes, powders^[1], or granules, within the physical custody^[2] of a member company, from containment to ground or water outside member-operated facilities and estimated to be greater than 0.5 litre or 0.5 kilogram per incident.

More information:

<https://www.opcleansweep.org/pledge/ocs-blue>

Many other associations have a license in order to promote the OCS programme.



EUROPE

- | | | |
|-----------|------------------------|----------------|
| Norway | Macedonia | Poland |
| Sweden | Albania | Germany |
| Finland | Montenegro | Switzerland |
| Estonia | Kosovo | Denmark |
| Latvia | Bosnia and Herzegovina | Netherlands |
| Lithuania | Serbia | Belgium |
| Belarus | Croatia | France |
| Ukraine | Hungary | Spain |
| Moldova | Slovenia | Portugal |
| Romania | Austria | United Kingdom |
| Bulgaria | Czech Republic | Ireland |
| Greece | | Russia |

6.2 Port of Antwerp new action plan



The journey towards zero pellet loss in the Port of Antwerp (PoA) started in 2017, when the Zero Pellet Loss (ZPL) Initiative was jointly launched by Alfaport Voka, essencia, PlasticsEurope, PoA authority and Voka. This value chain collaboration, within the Operation Clean Sweep® programme was aimed at uniting forces to prevent plastic pellets from ending up in the environment – by implementing a common methodology of pellet containment at each step of the value chain, and by continuing to raise awareness on the issue. Given the significant pellet loss issue in the Port of Antwerp, plastics producers and logistics companies want to intensify the fight against pellet loss. All together, they established a plan with concrete actions in relation to worksite equipment, procedures, auditing performances and outreach, as well as cleaning actions. The implementation of this action plan began in November 2019. Progress will be reported in the Operation Clean Sweep® Port of Antwerp Activity Report 2021.

6.4 Scottish steering group on pellet loss



The Scottish Government asked Zero Waste Scotland to lead on a project to develop and test a ‘supply-chain approach’ with industry that will tackle pellet loss across the full supply chain and can be implemented fully to demonstrate progress by 2020, avoiding the introduction of further legislation. The outcome of the project should be a well-designed mechanism which gives assurance to buyers of plastic products (e.g. retailers or brand-owners) that their supply chain is handling pellets responsibly and preventing their loss to the environment. Recommendations to authorities based on trial projects are expected to take place in view to inform government policy to reduce pellet loss. The trial results may also be published with lessons that can be shared with other countries or bodies working on the pellet loss problem, thus influencing how pellets are managed in supply chains beyond Scotland.

6.3 Iberia, the value chain works together and boosts OCS in the region



In 2017, a collaboration agreement was signed by PlasticsEurope and the Spanish Plastics Converters Association (ANAIP) to promote the implementation of OCS throughout the plastics value chain. In less than three years, more than 100 companies among them producers, converters, logistics (including two Mediterranean ports: Tarragona and Cartagena) and distributors, have signed the OCS commitment. A similar agreement was signed in 2019 with APIP (Portuguese Association of Plastics Industries) and we expect to see good results in Portugal in 2020.

In addition, ANAIP, with the support of PlasticsEurope and the collaboration of the international certification company AENOR, has been a pioneer in the development of an OCS certification scheme. In 2019, two major Spanish converters obtained the OCS certificate, one of them not only for its facilities in Spain but also in other European countries. The purpose of this certification scheme is for a third party, outside the company’s interests, to verify that it has effectively followed the six steps of the OCS commitment to prevent plastic pellets from reaching the environment.





7

Outlook

2020

- Develop OCS requirements for OCS certification scheme
- Engage with external stakeholders to define a common way to estimate pellet loss emissions

2021

- Initiate discussions with transportation and shipping industries to develop measures to handle accidental loss (e.g. Container loss at sea)
- Pilot to test the OCS certification scheme

2022

- Start OCS certification scheme audits
- New OCS website
- Continue to develop tools to help companies in implementing the programme
- Develop with the plastics value chain a methodology to estimate pellet loss emissions into the environment



2025

- Have all PlasticsEurope members OCS certified

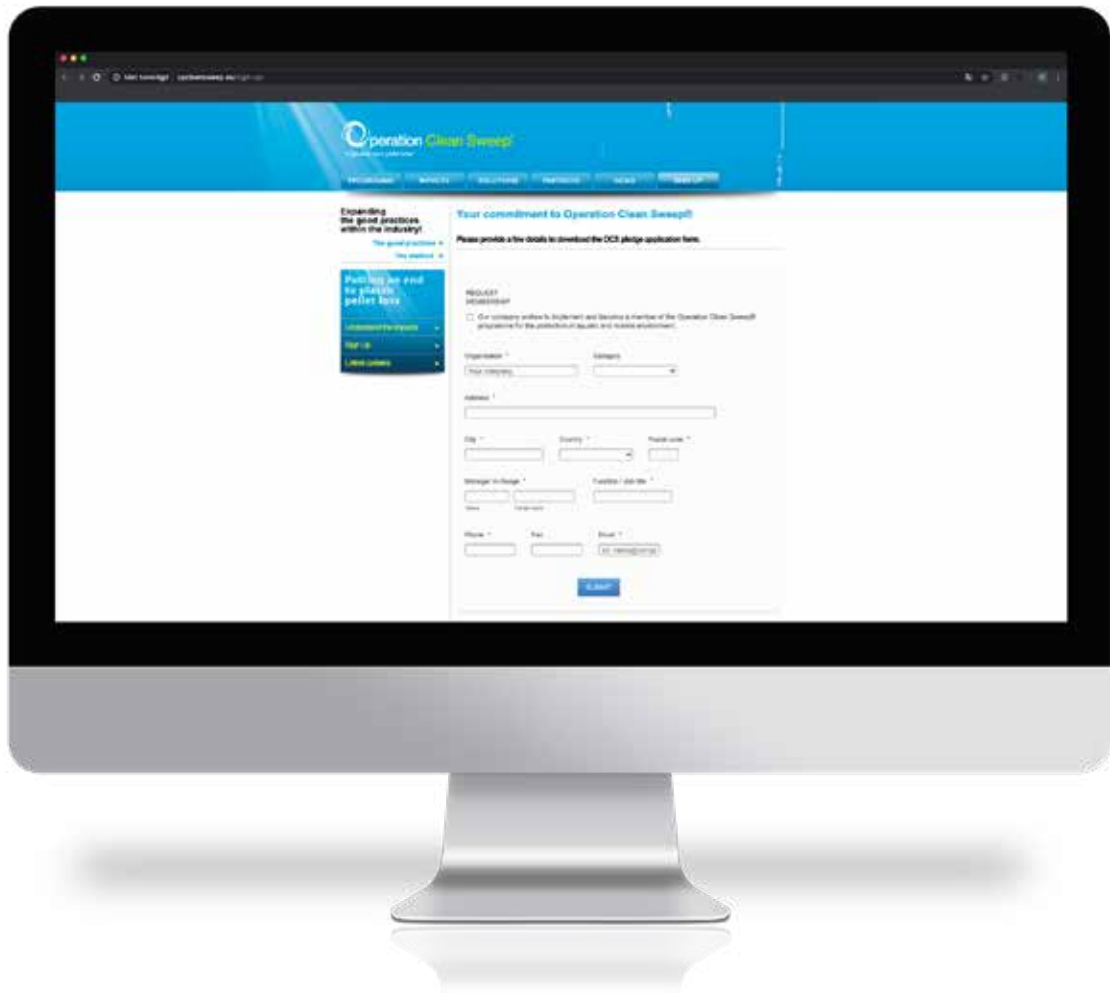
2030

- Continue to develop engagement of major industrial pellet handling clusters

8

OCS Pledge:

1. Go to the OCS website
2. Fill in your details
3. Receive the pledge documents
4. Fill in the pledge and send it signed to PlasticsEurope
5. Implement best practices



Fill in the pledge



Shell Chemicals



1 Gabriel Technologie

Meet the team

Regional OCS contact persons @ PlasticsEurope

OCS Project Manager: Jérémy Fouriau



PlasticsEurope HQ

Rue Belliard 40, box 16
1040 Brussels – Belgium

☎ +32 (0) 2 792 30 45

✉ jeremy.fouriau@plasticseurope.org

Belgian Office: Charlotte Delvaux



PlasticsEurope Belgium

Rue Belliard 40, box 16
1040 Brussels – Belgium

☎ +32 (0) 2 792 30 25

✉ charlotte.delvaux@plasticseurope.org

North Region: Kim Christiansen



PlasticsEurope UK

6 Bath Place, Rivington Street
EC2A 3JE - London - United Kingdom

☎ +44 20 7457 50 29

✉ kim.christiansen@plasticseurope.org

Iberian Region: Juan Ruiz



PlasticsEurope Spain

Hermosilla 31
28001 Madrid - Spain

☎ +34 91 426 31 58

✉ juan.ruiz@plasticseurope.org

West Region: Eric Quenet



PlasticsEurope France

Le Diamant A - 14, rue de la République
92800 Puteaux – France

☎ +33 (1) 46 53 10 55

✉ eric.quenet@plasticseurope.org

Dutch Office:
Josepha van Kollenburg



PlasticsEurope Netherlands

Loire 150
2491 AK The Hague - The Netherlands
☎ +31 (0) 652 82 35 18
✉ josepha.vankollenburg@plasticseurope.org

Polish Office:
Kazimierz Borkowski



PlasticsEurope Polska

ul. Trębacka 4,
00-074 Warsaw - Poland
☎ +48 22 630 99 01
✉ kazimierz.borkowski@plasticseurope.org

Central Region:
Ingo Sartorius



PlasticsEurope Deutschland e. V.

Mainzer Landstrasse 55
60329 Frankfurt am Main – Germany
☎ +49 (0) 69 2556 1360
✉ ingo.sartorius@plasticseurope.org

Austrian Office:
Sabine Nádherny-Borutin



PlasticsEurope Austria

Paniglgasse 24/I/19a
1040 Vienna - Austria
☎ +43 699 190 34 943
✉ sabine.nadherny@plasticseurope.org

Mediterranean Region:
Giuseppe Riva



PlasticsEurope Italy

Via Giovanni da Procida 11
20149 Milano - Italy
☎ +39 2 34565371
✉ giuseppe.riva@plasticseurope.org

Endnotes and sources

P. 5 - Foreword

1. By signing up to OCS, members pledge that they will: improve their worksite(s) set-up to prevent and address spills; create and publish internal procedures to achieve “zero pellet loss” goals; provide employee training and accountability for spill prevention, containment, clean-up disposal; audit their performance regularly; comply with the applicable local and national regulations governing pellet containment; encourage their partners (contractors, transporters, etc.) to pursue the same objectives. In Germany, “Null Granulatverlust” or “Null Pelletverlust” are part of this Global OCS programme with similar objectives.

P. 8 - Plastic pellets in the environment

2. A compilation by Fauna & Flora International of scientific publications with different definitions of ‘microplastics’ can be found here: <https://issuu.com/faunaflora/docs/microbeads-guidance-document/24>. The Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP) has also published a series of reports and studies on microplastics. Available at: <http://www.gesamp.org/publications>

3. SAPEA, Science Advice for Policy by European Academies (2019). A Scientific Perspective on Microplastics in Nature and Society. Berlin: SAPEA. <https://doi.org/10.26356/microplastics>

4. Eunomia (2018). Investigating Options for Reducing Releases in the Aquatic Environment of Microplastics Emitted by (but not intentionally added in) Products. Available at: <https://www.eunomia.co.uk/reports-tools/investigating-options-for-reducing-releases-in-the-aquatic-environment-of-microplastics-emitted-by-products/>

5. Quantis + ea (2020). The Plastic Leak Project. Available at: <https://quantis-intl.com/metrics/initiatives/plastic-leak-project/>

6. OSPAR Commission (2018) OSPAR Background document on pre-production Plastic Pellets. Available at: <https://www.ospar.org/documents?v=39764>

7. An overview of the trends 2007-2016 is available at: <https://oap.ospar.org/en/versions/plastic-particles-in-fulmar-stomachs-north-sea-en-1-0-0/>

8. © OSPAR Commission, Intermediate Assessment 2017. <https://oap.ospar.org/en/ospar-assessments/thematic-assessments/eiha-thematic-assessments/marine-litter/plastic-particles-in-fulmar-stomachs-north-sea/>

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9. The latest updates on signatories can be found on the OCS website www.opcleansweep.eu.

10. In 2019, amongst 56 PlasticsEurope members, OCS was applicable to 52 companies. Current PlasticsEurope members are listed on the association website. <https://www.plasticseurope.org/en/about-us/membership>

11. This change of statutes only applies to PlasticsEurope full members to which OCS is applicable, excluding associate members. A period of 6 months is foreseen for new members to sign up to the programme.

PlasticsEurope AISBL

Rue Belliard 40, box 16
1040 Brussels - Belgium

Phone: +32 (0)2 792 30 99

info@plasticseurope.org
www.plasticseurope.org

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PlasticsEurope
Association of Plastics Manufacturers