



Licensee Adhesives Research Ireland Ltd.
Raheen Business Park
Limerick

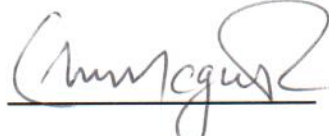
Report Title Annual Environmental Report 2018

Licence No. P0452-1

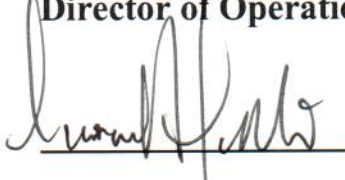
Time Period January to December 2018

Prepared By  **Date** 26/3/19

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EH&S Manager

Approved By  **Date** 26/03/2019

Colm Maguire
Director of Operations

Approved By  **Date** 26/03/2019

Ciaran Gloster
Managing Director Europe

Introduction

This is the 2018 annual environmental report for Adhesives Research Ireland Ltd.

Licence Register Number: P0452-01
Licensee Adhesives Research Ireland Ltd
Raheen Business Park
Limerick
Contacts Mr. Ger Harte (Environmental, Health & Safety Manager)
Mr. Ciaran Gloster (Managing Director Europe)

Company Background

Adhesives Research is an independent developer and manufacturer of high-performance, custom pressure-sensitive adhesives (PSAs), tapes, coatings, specialty films, and laminates. The company's North American facilities and corporate headquarters is located in South Central Pennsylvania (Glen Rock, PA) on a campus of over 140 acres.

Adhesives Research Ireland Ltd., a subsidiary of Adhesives Research Inc., has sales, R&D, manufacturing and quality operations based in Limerick.

The Limerick facility is certified to clean environment standards and is cGMP-compliant, with segregated clean rooms. Its coating capabilities include two lines, each located in a separate clean room. The coating techniques available include reverse roll, knife-over-roll, as well as slot die. Both coating lines are fitted with state of the art scanning and gauging systems to control coat weight. All critical parameters on these coating lines are computer controlled and monitored to ensure superior process control.

Adhesives Research Ireland's Quality Management System is certified to ISO9001:2015 and ISO13485:2012. The Company holds an IPC license and the EHS Management System is certified to ISO14001:2015 and OHSAS18001:2007.

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During 2018 a surveillance audit was carried out on the Environmental, Health & Safety Management System by NSAI and a recertification audit was carried out on the Quality Management System by NSAI. The management system will continue to be integrated over the next number of years

Process Description

Adhesives Research Ireland Ltd. currently employees 63 people across the following areas:

- manufacturing
- quality assurance, quality control
- sales, customer service, administration
- research and development
- engineering and maintenance

The manufacturing process consists of 3 stages: adhesive mixing in the chemical operations department, coating and slitting followed by packaging and shipping of converted tape products directly to the customer's site.

Chemical Operations

Chemical Operations are carried out in two dedicated rooms. The main raw materials required for manufacturing pressure sensitive adhesives are solvents and adhesive bases. The most common solvents which are used are methyl ethyl ketone, toluene and ethyl acetate. Other raw materials include rubber and additives. Chemical Operations involves the introduction of specified quantities of the raw materials into a 200 litre drum, mixing ingredients together via wall mounted mixers with mixer shaft protruding through the lid to reduce possible solvent loss as fugitive emissions and prevent any possible splashing of adhesive from drum. A movable extract hood is provided to remove any solvent vapours which arise. These rooms have a dedicated air handling unit (AHU) with 15 air changes per hour. Emissions from this AHU are considered fugitive emissions. As our coating lines run either 24/5 or 24/7 all emissions from this room are fed into the common exhaust duct and being treated by one of our regenerative thermal oxidisers (RTO).

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In addition a number of water based adhesive /film formulations have been commercialised. A water based emulsion adhesive is coated on average 5 days per year. The emissions from the drying this product is sent to the RTO to reduce odours from the site

During 2018 Chemical Operations operated both a 16 hours X 5 days per week shift cycle and a 12 hours X 7 days shift cycle. No plans are envisaged to move to three cycle shift.

Coating

The adhesive mix is connected to the coater /dryer via a hose and pump. The adhesive is either pumped into a trough/reservoir located in the coating head section of the machine (reverse roll and knife over roll coating) or fed directly to a slot-die coating head using an adhesive delivery system (slot die coating).

The use of slot-die coating allows for a reduction in the amount of solvent per drum of adhesive.

The adhesive is coated onto a roll of paper or film at a specified thickness, dried at specified temperatures, self wound onto itself or an additional liner is laminated in to yield a final master roll. When coated the wet adhesive passes through the dryer where the solvent /water will be removed using clean hot air. The dryer uses natural gas for its energy requirements. The dryer is designed to operate with a 40% lower explosive limit with LEL safety monitors designed to alarm at 45% LEL and to shut down the machine at 50%. There is a complete control system to carry out all control, sequencing, interlocking, alarm and recording functions. Vapours from the dryer are exhausted to the thermal oxidiser.

During 2018 B1 Coating ran both 24 X 5 and 24 X 7 shift cycles. A1 Coating ran 12 X 3 and 12 X 4 shifts on alternate weeks. The plan for 2019 is that B1 Coating runs 24 X 5 and A1 Coating runs 16 X 5.

Some additional features on the B1 Coating Line allow continuous processing, quick change over and automated mechanisms to join reels together (splicing). All of these

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features allow continuous processing and reduction in levels of scrap generated when process changes from one completed reel of coated stock to start of the next reel.

Slitting

Coated rolls are taken into the slitting area where they are slit down into customer specified roll lengths and widths via one of several possible slitting machines. These slit rolls are then removed to a packaging area where they are placed into cardboard cartons, sealed and placed on wooden pallets. Palletised product is shrink wrapped, weighed and transported off site via container trucks to the customer. The slitting department operates 16 hours X 5 days per week

QC & R&D Laboratories:

QC laboratory completes all incoming product and final product testing. The QC laboratory operates 16 hours X 5 days per week

R&D laboratory supports product development and operates 8 hours X 5 days per week

Environmental Policy

Adhesives Research Ireland has a combined Environmental, Health and Safety Policy. This is part of the documentation that is required for the EHS Management systems ISO14001:2015 and OHSAS18001:2007

Adhesives Research Ireland Environmental Health & Safety Policy

Adhesives Research Ireland is a developer and manufacturer of high performance pressure sensitive adhesives, tapes and speciality coatings that meet our customers agreed expectations

Adhesives Research Ireland are committed to managing and conducting their work activities in such a way as to ensure, so far as is reasonably practicable, the safety, health and welfare at work of their employees and others who may be affected by their business activities and also to minimising pollution and adverse impacts on the environment.

We are committed to complying with all applicable Environmental, Health & Safety (EHS) legislation and other requirements that apply to our activities and services.

To enable us to meet these commitments we have implemented an integrated EHS Management system based on international standards.

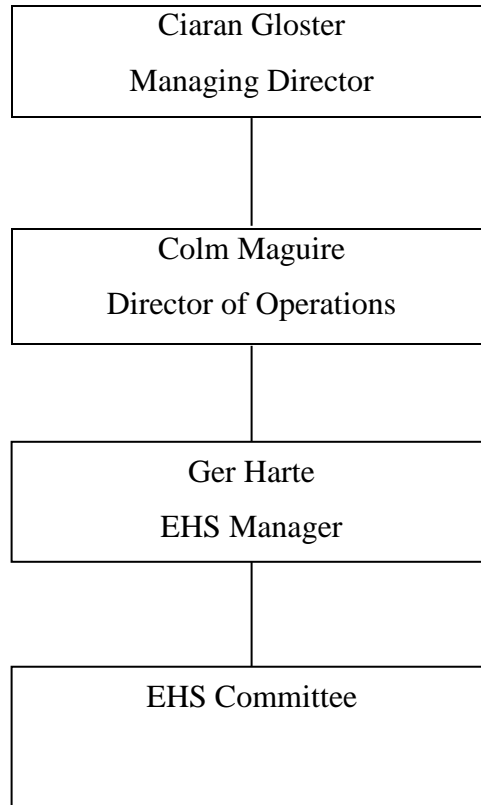
At Adhesives Research Ireland we are committed to striving for Continual Improvement of our EHS Management System by utilising various improvement methods, including setting specific, measurable objectives and reviewing their progress and success on a regular basis.

Employees share a responsibility with management in ensuring their own safety while at work and minimising impacts on the environment. This Policy and our EHS Management System requires the co-operation of all staff, visitors, contractors and others to enable Adhesives Research Ireland to discharge it's responsibilities under law, and the commitments outlined in this policy.

Adhesives Research Ireland is committed to upholding the principles outlined in this EHS Policy. Sufficient authority and resources, both financial and otherwise, will be made available to enable staff to carry out their responsibilities in a reasonable and efficient manner.

This Policy is publicly available and is communicated to all employees and other interested parties. The EHS Policy will be reviewed in light of experience and future developments within the organisation.

Environmental Management Organisation Chart



Changes during 2018

No changes during 2018

Self Monitoring Data

Emissions to Atmosphere

Since August 2009 the monitoring of emissions to atmosphere has been carried out using the Continuous Emission Monitoring System (CEMS).

All the data from 2018 for both air emission points A2-1 & A2-2 complied with the conditions of Adhesives Research Ireland's IPPC Licence. The emission limit value for Total Organics as Carbon as per the IPPC Licence is 50 mg/m³.

No air monitoring was carried out by the Agency or by contractors on behalf of the Agency during 2018

The CEMS experienced the following downtime during 2018

May 3rd 09:30 to May 4th 08:29
Analysing but not storing data. PC restarted

September 22nd 02:15 to September 24th 15:10
Unit ran out of gas. Gas changed

October 13th 03:36 to October 15th 10:26
Analysing but not storing data. PC restarted. No production during this time

October 27th 17:04 to October 30th 11:26
Unit ran out of gas. Gas changed. No production during this time

December 1st 22:36 to December 3rd 09:56
Analysing but not storing data. PC restarted

Adhesives Research Ireland Limited have a preventative maintenance and calibration contract for their CEMS with Environmental Monitoring Systems

Summary of Bypass Emissions

0.6 kg of solvent was lost as a result of fugitive emissions from A1 coating, emission point A2-1

72.2 kg of solvent was lost as a result of fugitive emissions from B1 coating, emission point A2-2

Ground and Surface Water Discharge Monitoring

As per Condition 8.1 of our IPPC Licence, the ground water discharge, GE1, was visually inspected daily. The sample was checked for Colour, Clarity and Odour. This is recorded in the Surface Water Discharge Inspection Log Book (Form Number M0045).

As was agreed with the Agency in October 2008 the surface water discharge, SE1, was visually inspected weekly. On days when there was a flow at this point a sample was checked for Colour, Clarity and Odour.

No contamination was evident from either the daily checks of GE1 or the weekly checks of SE1.

The following monitoring was carried out on the ground and surface water discharge.

Date	Sampled By	Location	COD mg/l	Conductivity μS/cm	Temp $^{\circ}$C
23/04/18	EPA	GE1	<20	144	11.8
14/05/18	Adhesives Research	SE1	8	82	12.3
14/05/18	Adhesive Research	GE1	9	166	13.0
06/11/18	Adhesives Research	SE1	10	45	10.3
06/11/18	Adhesives Research	GE1	4	105	11.1

Notes

- 1) SE1 has been sampled at least twice a year
- 2) The following warning and action limits have been set for GE1 and SE1; COD warning 45 mg/l, action 60 mg/l. Conductivity warning 350 μ S/cm, action 375 μ S/cm

Noise Survey

As per condition 7.3 of our IPC Licence, a noise survey was carried out on site. The survey was carried out on March 15th 2018.

In total 5 agreed noise monitoring locations were chosen for the purpose of the noise survey, locations N1 to N4 and NS. There are no buildings in the vicinity of Adhesives Research Ireland except industrial buildings. There are no dwellings within at least a mile of Adhesives Research Ireland.

The monitoring locations are as follows;

- N1 Main entrance to the site, beside the road
- N2 Second entrance to the site, beside the road, close to entrance to Dell EMF1
- N3 At south boundary of site, closest location to the RTO and chillers, main noise sources
- N4 At east boundary site
- NS At the south east corner of the site

The complete noise reports together with calibration certificates for the equipment used have been submitted via the ALDER reporting portal.

The summary conclusion of the monitoring is as follows;

Five locations were monitored for broadband and 1/3rd Octave frequency as part of this annual environmental noise survey at Adhesive Research Ireland Limited (ARIL).

Each boundary monitoring point (N1 to N4) was monitored for 15 minute periods during the day and night time survey. As these points are located within the boundaries of the site, and are not in the vicinity of any noise sensitive receptors, these points may not be subject to compliance limits in agreement with the Agency.

As there are no identified noise sensitive locations off-site, noise monitoring was carried out at boundary locations on-site. However, NS is an agreed noise sensitive location and therefore expected to comply with limits outlined in the License P0452-01.

The findings of the survey would indicate that the noise sensitive location was not significantly affected or impacted by sources of noise at ARIL, but heavily influenced by traffic movements on the M20 and in the surrounding estate.

The monitoring point NS, the agreed noise sensitive location, had elevated Leq noise levels during the day time noise survey [58 dB(A)]. This was mainly due to the almost constant background noise levels attributed to distant traffic movements on the M20

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motorway. The guidance for a location like this is to use the LA90 for assessment of noise from the ARIL site, to reduce the impact of interference from road traffic movements, in which case noise levels at NS are shown to be within compliance under the requirements of the licence. The night time noise was also elevated however use of the L90 was insufficient as the background noise from traffic movements was constant and continuous.

There was no tonal noise determined at either monitoring location; therefore there are no requirements to apply penalties to the broadband measurement.

As a follow up to the noise survey the following information was supplied to the Agency to prove that the elevated night time noise level at NS did not originate from the Adhesives Research Ireland Limited site.

It was confirmed that there was no production during the time period (22:06 to 23:06) of the night time survey. In fact there was no production during the following times; 21:20 to 23:30

Regarding the designated noise sensitive location, there is no reason on file why this location was designated a noise sensitive location. There are no residential locations in the vicinity of the noise monitoring point. In fact the land that is adjacent to the noise monitoring point is undeveloped/unoccupied land in the industrial estate.

Regarding the light operational noise, the source of this noise would be our air handling units which keep the facility at optimum operating temperature and humidity operating ranges.

Data from our Continuous Monitoring System was submitted to the Agency as proof that there was no production during the monitoring time period

Agency Monitoring

Ground water monitoring carried out by the Agency has already been discussed in this document.

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Agency Enforcement

No Agency enforcement visit took place during 2018.

Environmental Incidents

There were no environmental incidents during the calendar year 2018.

Complaints

Adhesives Research Ireland Ltd. received no environmental complaints during the calendar year 2018. There is a log book in place for Queries Regarding Environmental, Health and Safety Performance, form number M0092.

Energy & Water Consumption

The following table details the energy and water consumption. There is no process water used on-site. The consumption of water is due to canteen and sanitary usage.

Natural Gas	6986 MWhr
Electricity	1787 MWhr
Water	Note 3

Note 3

We have not received water usage data from Limerick City & County Council for 2018.

The usage during 2017 was estimated at 60 m³. This figure will also be used as the estimate for water usage for 2018.

Bund Integrity Tests

The Fire Water Retention Tank and Chemical Storage Unit 1 were bund tested during 2018. As per licensee return number LR036802 the reports were submitted to the Agency. Both locations passed the required tests. The test will be repeated for these locations in 2021.

Solvent Management Plan

Adhesives Research Ireland have prepared a Solvent Management Plan (SMP).

The SMP is located in Appendix 2 of this report.

The SMP will be prepared and reported yearly.

Any recommendations generated by the SMP will be incorporated into the Schedule of Environmental Objectives and Targets.

Closure, Residuals and Aftercare Management Plan

Adhesives Research Ireland submitted a Closure, Residuals and Aftercare Management Plan (CRAMP) to the Agency in 2010.

This document was reviewed in 2018 and was submitted to the Agency as part of licensee return number LR034015

Environmental Liabilities

Adhesives Research Ireland submitted an Environmental Liabilities Risk Assessment (ELRA) to the Agency in 2010.

This document was reviewed in 2018 and was submitted to the Agency as part of licensee return number LR034017

Environmental Management Programme Report

Objectives 2018: Status Report

Solvent Minimisation and Emissions Reduction:

Objective & Target 1

Solvent Management Plan was completed.

The destruction efficiency of the Thermal Oxidisers was calculated as preparation for the 2018 Annual Environmental Report.

The results were as follows;

A1 RTO 97.97%

B1 RTO 99.31%

No issues with the Thermal Oxidisers were identified during the maintenance shutdown period.

Objective & Target 2

The amount of solvent used per m² for 2018 was calculated as 99.92 grams of solvent used on site per meter squared of material coated.

Due to an extensive change in product mix this has increased from the figure in 2017.

The project to move one of our highest volume products from narrow web A1 Coating to wide web B1 Coating was completed in 2018. The adhesive usage attributed to this product reduced from 149.2 g/m² in 2017 to 145.7 g/m² in 2018, a 2.3% reduction in adhesive usage. This resulted in 1.5 tonnes less of adhesive being used

Waste Management

Objective & Target 3

A haulier audit was carried out by our waste management partner in Quarter 3 2018.

There were no adverse findings

The site visit to the hazardous waste facility has been postponed to 2019

Monthly meetings continue to take place with our Total Waste Management partner

Objective & Target 4

The recovery/reuse/recycling rate of non-hazardous waste during 2018 was 100%
The Greenstar Limerick site was visited again during Quarter 3 2018. Non-hazardous waste from Adhesives Research Ireland was being processed during the visit
Monthly meetings take place with Total Waste Management partner.

Objective & Target 5

The project to move one of our largest volume product from narrow web A1 Coating to wide web B1 Coating was completed.
The amount of material diverted from waste was 17,078 meters which is equivalent to 1.79 tonnes to material diverted from waste

Management Systems

Objective & Target 6

Environmental objectives and targets were set during Quarter 1 2018. The EHS Management Programme was drafted at the same time to ensure one set of objectives and targets
Surveillance audit for ISO14001 and OHSAS18001 took place during Quarter 2 2018.
There were no non-conformances associated with the audit.
Internal Quality, Environmental, Health and Safety audits took place during 2018

Energy Savings/Green Energy Products

Objective & Target 7

The comparison between energy use in 2016, 2017 & 2018 is checked in the table below;

	2018	2017	2016
Square Meters Coated Per Year	2,304,574	2,128,655	1,917,553
Gas Usage Per Year (MWhr)	6986	7228	7512
Gas KWhr per m ²	3.03	3.41	3.92
Electricity Usage Per Year (MWhr)	1787	1744	1641
Electricity KWhr per m ²	0.78	0.82	0.86

Gas usage decreased in 2018 and electricity usage increased during the year. However the KWhr per m² of coated material for both gas and electricity have trended downwards over the past 3 years.

The investigation of installing LED lighting has been postponed until 2019

After discussions with the engineers who supplied our RTOs it is not possible to determine if they are running in auto thermal without modifications to the controls of these units.

The output of the BMS was checked and the energy associated with them was not deemed as excessive

Environmental Management Programme 2019

Objective & Target 1

Solvent Minimisation & Emission Reduction

Carry out Solvent Management Plan.

Complete recommendations identified in Solvent Management Plan

Forward any recommendations from the Solvent Management Plan regarding the Thermal Oxidisers to engineering/maintenance to be dealt with during the maintenance shutdown.

Target

Calculate the actual destruction efficiency of the thermal oxidiser. This will be used in future fugitive emission assessment-solvent management plans.

Timeline

Carry out testing on Thermal Oxidisers during Quarter 1 2019.

Any issues arising from the testing to be addressed during maintenance shutdown which takes place during Quarter 3 2019.

Responsibility

EHS Manager to undertake the testing.

Engineering Manager to manage any issues that may arise during the testing.

Objective & Target 2

Solvent Minimisation & Emission Reduction

Reduce solvent usage per m² of coated product

Target

Compare solvent use per m² for different products and for the different coating lines

Timeline

The comparison of solvent use per m² will be completed by Quarter 4 2019

Responsibility

EHS Manager and Director of Operations are responsible for this project.

Objective & Target 3

Waste Management

Improve management of waste.

Target

Carry out audit of hazardous waste transport

Visit a site where hazardous waste generated at Adhesives Research Ireland is disposed

Continue regular meetings with Total Waste Management Partner

Publish recycling figures every month.

Site visit of non-hazardous waste partner with respect to Adhesives Research Ireland's non-hazardous waste.

Timeline

Audit hazardous waste transport during Quarter 2 2019

Visit hazardous waste disposal site during Quarter 2 2019

Regular meetings with Total Waste Management Partner are on-going.

Visit non-hazardous waste disposal site during Quarter 3 2019

Responsibility

EHS Manager is responsible for achieving this target.

Objective & Target 4

Reduction in waste generated at source

Investigate reduction in waste generated during manufacturing process.

Target

Process Engineering to identify an additional opportunity for waste reduction during the manufacturing project

Quantify the amount of material diverted from waste streams.

Timeline

Execute project reducing operational waste by Quarter 4 2019

Quantify amount of material diverted from waste streams during Quarter 4 2019

Responsibility

Process Engineering responsible for this objective.

Objective & Target 5

Management Systems

Continue to maintain and improve management systems.

Target

Surveillance audit of ISO9001:2015, ISO14001:2015 and OHSAS18001:2007 management systems

Carry out integrated Quality, Environmental, Health and Safety (QEHS) internal audits.

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Timeline

Set Environmental Objectives & Targets during Quarter 1 2019

Surveillance audit of ISO9001:2015, ISO14001:2015 and OHSAS18001:2007 management systems during Quarter 2 2019

Internal QEHS Audits on-going during 2019, new audit plan to be put in place during Quarter 1 2019.

Responsibility

EHS Manager and Quality Manager responsible for the integrated management system.

Objective & Target 7

Energy management

Monitor and where possible reduce energy use.

Target

Compare energy usage per m² per coated with previous years

Investigate the possibility of installing LED lighting outside the facility

Timeline

Compare energy usage per meter coated in 2019 with previous years during Quarter 4 2019

Engage with energy/lighting company regarding LED Lighting by Quarter 1 2019

Responsibility

Engineering Manager is responsible for implementing any energy management items.

Objectives and Targets 2020 to 2023

<u>2020</u>	<u>2021</u>	<u>2022</u>	<u>2023</u>
<p><u>Solvent minimisation and emissions reduction:</u></p> <p>Carry out Solvent Management Plan</p> <p>Complete recommendations identified in Solvent Management Plan.</p> <p>Test efficiency of Thermal Oxidisers</p> <p>Develop projects for reducing solvent use for m² of product, based on information obtained in quantifying use.</p>	<p><u>Solvent minimisation and emissions reduction:</u></p> <p>Carry out Solvent Management Plan.</p> <p>Complete recommendations identified in Solvent Management Plan.</p> <p>Test efficiency of Thermal Oxidisers</p> <p>Investigate whether extrusion technology may be used in the future.</p>	<p><u>Solvent minimisation and emissions reduction:</u></p> <p>Carry out Solvent Management Plan.</p> <p>Complete recommendations identified in Solvent Management Plan.</p> <p>Test efficiency of Thermal Oxidisers</p> <p>R&D to investigate solvent minimisation technology.</p> <p>Continue to investigate lower solvent technologies and improved efficiency at the Thermal Oxidiser.</p>	<p><u>Solvent minimisation and emissions reduction:</u></p> <p>Carry out Solvent Management Plan.</p> <p>Complete recommendations identified in Solvent Management Plan.</p> <p>Test efficiency of Thermal Oxidisers</p> <p>Determine if Thermal Oxidisers should be replaced.</p> <p>Investigate if lower energy use/energy reuse options are available for Thermal Oxidisers</p>

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<p><u>Waste Management:</u> Continue to transfer existing products to wide web coating. Work on waste reduction/diversion projects as identified in Total Waste Management Contract.</p>	<p><u>Waste Management:</u> Continue waste minimisation programme. Implement a waste reduction team across the organisation and develop projects to be managed within the EMP. Conduct trials on solvent recycling and/or re-use.</p>	<p><u>Waste Management:</u> Work on waste reduction/diversion projects as identified in Total Waste Management Contract</p>	<p><u>Waste Management:</u> Investigate if hazardous waste currently being sent overseas for disposal can be disposed of in Ireland</p>
<p><u>Energy:</u> Continue with energy projects that were being worked on in 2019. If possible improve the amount of time that RTOs are working in auto-thermal</p>	<p><u>Energy:</u> Monitor auto-thermal ignition at RTO and continue to optimise energy requirements Start asset replacement plan for RTOs</p>	<p><u>Energy:</u> Evaluate the energy management system requirements of ISO 50001.</p>	<p><u>Energy:</u> Carry out energy audit</p>

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<p><u>Management Systems:</u> Maintain ISO 14001 and obtain certification to ISO 45001, and use the EMP and the Corrective and Preventive Action systems for continual improvement of environmental performance. Continue integration of management system. Carry out an Environmental Audit of a major supplier.</p>	<p><u>Management Systems:</u> Maintain ISO 14001 and ISO 45001 and use the EMP and the Corrective and Preventive Action systems for continual improvement of environmental performance. Continue integration of management system. Carry out an Environmental Audit of a major supplier.</p>	<p><u>Management Systems:</u> Maintain ISO 14001 and ISO 45001, and use the EMP and the Corrective and Preventive Action systems for continual improvement of environmental performance. Continue integration of management system. Carry out an Environmental Audit of a major supplier.</p>	<p><u>Management Systems:</u> Maintain ISO 14001 and ISO45001, and use the EMP and the Corrective and Preventive Action systems for continual improvement of environmental performance. Continue integration of management system. Carry out an Environmental Audit of a major supplier.</p>
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APPENDIX 1

POLLUTION EMISSION REGISTER

1. Introduction

Adhesive Research Ireland Ltd. is involved in the manufacture of high-performance pressure-sensitive adhesives, tapes, specialty coatings, films, and laminates. The Company is licensed to carry out the following activity under the terms and conditions of an EPA IPC licence (P0452-01):

- The use of coating materials in processes with a capacity to use at least 10 tonnes per year of organic solvents.

The main raw materials are solvent and other materials such as adhesives bases, rubber and additives. Condition 2.4 of this licence requires the company to submit a pollution emission register (PER) as part of the Annual Environmental Report. Adhesive Research Ireland Ltd. and the EPA have agreed on the following chemicals for inclusion in the PER:

- Ethyl Acetate
- Toluene
- Hexane
- Heptane
- MEK

There are five main processes carried out at the facility as detailed below:

1. Mixing
2. Coating, drying and laminating:
3. Slitting
4. Packaging
5. Treatment of air emissions by thermal oxidation

The coating and drying process generate a large amount of solvent emissions. These are directed to the thermal oxidisers in order to reduce VOC emissions to air. Annual solvent usage is provided in Table 1.

Table 1 Annual Solvent Use

Material	Annual Usage in 2018 (tonnes)
Ethyl Acetate	161.385
Toluene	35.500
Hexane	2.606
Heptane	2.484
Methyl Ethyl Ketone (MEK)	45.025
Total:	247.000

2. Methodology

The calculation and methodologies used in drafting the PER are outlined in this section. Adhesive Research Ireland Ltd. has the following inputs/outputs in relation to the materials listed.

All calculations are shown in *Appendix 1*

Table 2 Inputs

Inputs	Outputs
<i>Solvent Consumption</i>	<i>Stack Emissions</i>
	<i>Hazardous Wastes arising</i>
	<i>Residues in empty containers</i>
	<i>Treated</i>
	<i>Fugitive</i>

2.1 Inputs

Solvent Input

The company keep records of all raw materials utilised during the year. The solvent use in coating and cleaning is used to calculate solvent consumption. Information regarding the input of solvent is supplied to the Environmental Protection Agency annually as part of the Annual Environmental Report (AER).

Gross Usage Calculation:

The solvents form the basic raw materials used in the manufacture of adhesives. Therefore there was a 100% gross usage for all. There total organic carbon input of each solvent was established from the molecular weights of each material.

Table 3 Gross Usage 2018 & Gross Usage 2018 TOC as C

Material	Gross Usage 2018 (tonnes)	Gross Usage 2018 TOC as C (tonnes)
Ethyl Acetate	161.385	88.028
Toluene	35.500	32.413
Hexane	2.606	2.182
Heptane	2.484	2.087
Methyl Ethyl Ketone (MEK)	45.025	30.017
Total:	247.000	154.727

2.2 Outputs

Stack Emissions

Emissions to atmosphere are vented to two thermal oxidisers that service the coater/dyer and mixing rooms. (Emission point references: A2-1 and A2-2). Total Organic Carbon emissions are obtained from the air monitoring results. The emitted TOC as C for each individual solvent used was calculated as a percentage of the total TOC as C using the contributing gross usage tonnages of each solvent as a direct comparative.

Liquid Effluent

There is no liquid effluent.

Waste

The chemical make up of the waste disposed during 2018 was estimated.

Fugitive Emissions

On consideration of the gross usage and taking account of all outputs; air emissions, wastes and treated solvents, the unaccounted or fugitive emissions tonnage was established. As a percentage of total gross usage, fugitive emissions are 8.65%. Fugitive emissions arising from each individual solvent was derived using the comparative percentage contributing to overall gross usage 2018.

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Treated

Based on a RTO destruction rate of 97.97% for the A1 RTO and 99.31% for the B1 RTO it is established that 109.458 tonnes of solvent are treated annually. Again, the treated fraction of each individual chemical was established using the comparative contributing percentages of total gross usage for 2018.

Table 4 Pollution Emission Register

FACILITY IDENTIFICATION																
Facility Name				Adhesive Research Ireland Limited												
IPC Register No.				P0452-01												
Reporting period (m-yr to m-yr)				1 st January 2018 to 31 st December 2018												
Production units/amount				Adhesive basis, rubber and additives												
No. of Employees				63												
POLLUTANTS SUMMARY																
				Outputs								Eco-Productivity Indices				
Pollutant Name	CAS No.	Input (tonnes)	Gross Usage	Air (tonnes)	MOM	Liquid Effluent (tonnes)	MOM	Waste (tonnes)	MOM	Product	MOM	Recovery	Treated Note 1	MOM	Fugitive	MOM
Ethyl Acetate as C	141-78-6	88.028	88.028		M	0	N/A	15.634	E	0	N/A	N/A		M		C
Toluene as C	108-88-3	32.413	32.413		M	0	N/A	6.126	E	0	N/A	N/A		M		C
Hexane as C	110-54-3	2.182	2.182		M	0	N/A	0.239	E	0	N/A	N/A		M		C
Heptane as C	142-82-5	2.087	2.087		M	0	N/A	0.231	E	0	N/A	N/A		M		C
Methyl Ethyl Ketone as C	78-93-3	30.017	30.017		M	0	N/A	8.838	E	0	N/A	N/A		M		C
Total:	-	154.727	154.727	0.819	M	0	N/A	31.068	E	0	N/A	N/A	109.458	M	13.382	C

Note 1: Treated fraction is based on destruction rates of 97.97% for the A1 RTO and 99.31% for the B1 RTO

MOM: Method of Measurement.

This refers to the method used in determining losses to Air, Water and Land.

The following codes are to be used to demonstrate the method used:

<i>Method</i>	<i>Code</i>	<i>Method</i>	<i>Code</i>
Direct Measurement	M	Calculation	C
Estimation	E		

Appendix 1 PER Calculations

Pollution Emission Register

<i>material</i>	<i>Usage (t)</i>	<i>% of total</i>	<i>Usage TOC as C (t)</i>	<i>Waste (t)</i>	<i>Usage TOC as C – Waste (t)</i>	<i>air (t)</i>	<i>treated (t)</i>	<i>fugitive(t)</i>	<i>fugitive %</i>
Ethyl Acetate	161.385	65.34%	88.028	15.634	72.394	0.478	64.083	7.833	
Toluene	35.500	14.37%	32.413	6.126	26.287	0.173	23.269	2.844	
Hexane	2.606	1.05%	2.182	0.239	1.943	0.013	1.720	0.210	
Heptane	2.484	1.01%	2.087	0.231	1.856	0.012	1.643	0.201	
MEK	45.025	18.23%	30.017	8.838	21.179	0.140	18.748	2.292	
Total	247.000		154.727	31.068	123.659	0.819	109.458	13.382	8.65

Calculation of the contribution of each individual solvent:

The contribution of each individual solvent in the stack emissions, fugitive emissions and treated emissions streams had to be estimated. This was done by deducting the known waste figure from the known gross usage figure for each solvent. The resulting figures correspond to the sum of stack emissions, fugitive emissions and treated emissions for each solvent as can be checked with the total figure:

$$\text{“Total usage TOC as C – Waste”} = 123.659 = 0.819 + 109.458 + 13.382$$

The total fugitive emissions have been calculated as being 13.382 tonnes.

The percentage of contribution of each stream (air, treated, fugitive) was then calculated:

- Air = $0.819/123.659 = 0.66\%$
- Treated = $109.458/123.659 = 88.52\%$
- Fugitive = $13.382/123.659 = 10.82\%$

These percentages were then applied to each individual solvent, as shown below for Ethyl Acetate:

- Total Ethyl Acetate TOC as C – Waste = 72.394 t
- Ethyl Acetate in Air = 0.66% x 72.394 = 0.478 t
- Ethyl Acetate in Treated = 88.52% x 72.394 = 64.083t
- Ethyl Acetate in Fugitive = 10.82% x 72.394 = 7.833 t

RTO: Total Organics Calculations

	average readings over the year mg/m3	m3 /hour	mg/hour	mg/year	tonnes/year released	tonnes/year destroyed
A2-1	0.621	21000	13041	88104996	0.088	4.247
A2-2	4.702	23000	108146	730634376	0.731	105.211
Total	-	-			0.819	109.458

Notes

Figures based on 6756 hours per year

Destruction rate of 97.97% for the A1 RTO and 99.31% for the B1 RTO

APPENDIX 2

SOLVENT MANAGEMENT PLAN

1. Background and legislation

Adhesives Research Ireland Limited is an independent developer and manufacturer of high-performance, custom pressure-sensitive adhesives (PSAs), tapes, coatings, specialty films, and laminates. The company's North American facilities and corporate headquarters is located in South Central Pennsylvania (Glen Rock, PA) on a campus of over 140 acres.

Adhesives Research Ireland, operate a 36,000, square-foot, manufacturing and R&D facility in Limerick to provide custom adhesive-coated products throughout Europe and Asia

The company operate within the conditions of an Integrated Pollution licence (IPC) under Section 88 (2) of the Environmental Protection Act, 1992 to carry on the following activity: *The manufacture or use of coating materials in processes with a capacity to make or use at least 10 tonnes per year of organic solvents, and powder coating manufacture with a capacity to produce at least 50 tonnes per year (IPC License Reg No. 452-01)*

Adhesives Research Ireland falls under the scope of the Solvents Directive (1999/13/EC), which was implemented, into Irish Law via the Emissions of Volatile Organic Compounds from Organic Solvent Regulations 2002 (S.I 543 of 2002). The Regulations provide the means for controlling emissions of solvent vapours from 20 specified activities (as set out in **Schedule 1**) when they exceed the relevant solvent consumption thresholds (as set out in **Schedule 2**). Adhesives Research Ireland falls under the following activity:

Adhesive Coating

Any activity in which an adhesive is applied to a surface, with the exception of adhesive coating and laminating associated with printing activities.

The fugitive emission values allocated to this activity are:

- 25% of the solvent input when the solvent consumption is comprised between 5 and 15t
- 20% of the solvent input when the solvent consumption is greater than 15 t

Adhesives Research Ireland uses more than 15 tonne of solvents per year; in 2018 the solvent use was 247 tonnes. Therefore the obligations that the solvents regulations have imposed on Adhesives Research are the fugitive emissions will have to be less than 20% percentage of the solvents input.

2. Solvent management plan-mass balance

It is proposed to assess the fugitive emissions from the site according to Schedule 6 of the Solvent Regulations of 2002. The calculation of the fugitive emissions can be done by mass balances, using one of the two following equations:

- $F = I1 - O1 - O5 - O6 - O7 - O8$
- $F = O2 + O3 + O4 + O9$

The definitions for the terms used in these equations are as follows:

Inputs of organic solvents (I)

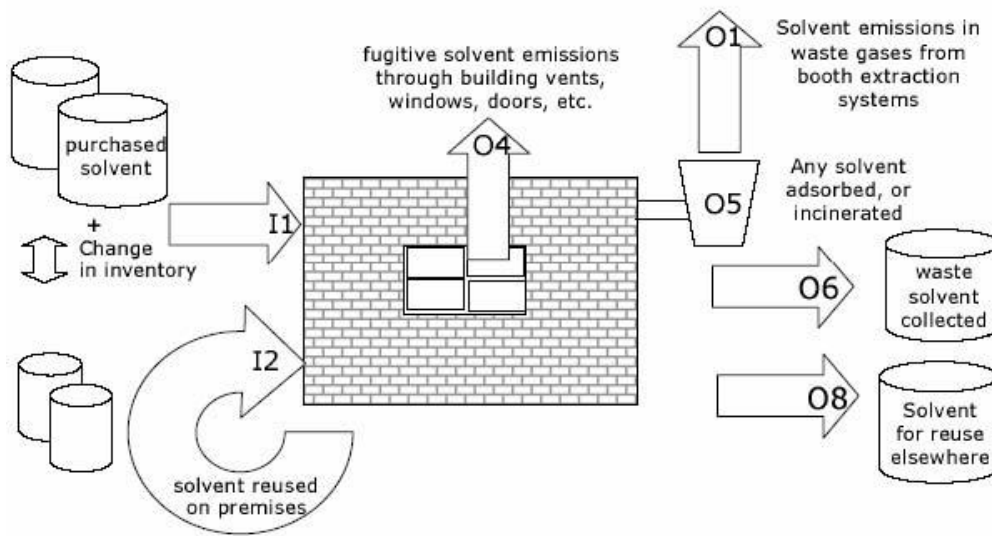
- I1: The quantity of organic solvents or their quantity in preparation purchased which are used as inputs into the process in the time frame over which the mass balance is being calculated
- I2: The quantity of organic solvents or their quantity in preparations recovered and reused as solvent input into the processes

Outputs of organic solvents (O)

- O1: Emissions in waste gases
- O2: Organic solvents lost in water
- O3: The quantity of organic solvent which remains as contamination or residue in produces output from the process.
- O4: Uncaptured emissions of organics solvents to air.
- O5: Organic solvents lost due to chemical or physical reactions.
- O6: Organic solvents contained in collected waste.
- O7: Organic solvents or organic solvents contained in preparations which are sold or are intended to be sold as a commercially valuable product.
- O8: Organic solvents contained in preparations recovered for reuse but not as input into the process, as long as not counted under.
- O9: Organic released in other ways.

These inputs and outputs can be visualised on the following figure that was obtained from the EPA's website.

Figure 1 Solvent mass balance framework



(Source: EPA July 2003, Best Practice guide produced by the Environmental Protection Agency draft date 17th July 2003 www.epa.ie)

2.1 Determination of the different Inputs and Outputs:

The information that is available at the site and from the various monitoring carried out suggests that the following equation is the most suitable to determine the fugitive emission value for the site:

$$F = I1 - O1 - O5 - O6 - O7 - O8$$

It is therefore proposed that this equation be used for the assessment.

The different parameters of this equation will be calculated as TOC as C and for the same period to be comparable.

I1: The quantity of solvent purchased during the given period:

The TOC as C contribution of the solvents will be calculated with reference to the MSDS sheets for each of the individual substances and the molecular formula of the constituents.

O1: Emissions in waste gases:

Waste gases are release and treated via a thermal oxidiser. The A1 RTO is 97.97% effective and the B1 RTO is 99.31% effective in treating all waste gases. Emission readings are calculated based on readings taken from the Thermal oxidiser. It also takes into account RTO bypass events

O5: Organic solvents lost due to chemical or physical reactions:

As the A1 RTO is 97.97% effective in treating waste gases. Treated gas is calculated as being total released gases multiplied by 97.97%.

As the B1 RTO is 99.31% effective in treating waste gases. Treated gas is calculated as being total released gases multiplied by 99.31%.

O6: Organic solvents contained in collected waste:

- Solvent and adhesive waste: the quantity of solvent and adhesive waste disposed of is recorded. The solvent content of these wastes are known, as they have been calculated on site based on percentages.

- Solvent residues in empty containers: According to 40 CFR 261.7, a container holding non-acute hazardous waste can be considered as empty if:
 - all wastes have been removed using practices commonly employed industry-wide to remove wastes from containers or liners, such as pouring, pumping, aspirating, and draining (§261.7(b)(1)(i)), and
 - no more than 2.5 centimetres (1 inch) of material remains in the container or liner (§261.7(b)(1)(ii)), or
 - no more than 3 percent by weight of the container remains for containers with a capacity of 110 gallons or less, and no more than 0.3 percent by weight remains for containers with a capacity greater than 110 gallons (§261.7(b)(1)(iii)).Therefore, the quantity of solvent residues in empty containers will be calculated on the basis that 3% by weight of the purchased solvent ultimately remains in the containers. Containers used by the company have a capacity of 200L, 60L, 30L, and 20L.

- Solvent residues in Solid Waste: The total amount of rags and filters sent off site is recorded and like the solvent and adhesive waste, the total concentration of solvent residues in the cleaning rags/filters etc is calculated based on percentages.

O7: Organic solvents or organic solvents contained in preparations which are sold or are intended to be sold as a commercially valuable product:

The products sold by Adhesives Research Ireland do not contain any solvent. All the solvent applied onto the unfinished products during the production process are believed to be either treated or released via the thermal oxidiser or emitted to the atmosphere as part of the fugitive emissions.

O8: Organic solvents contained in preparations recovered for reuse but not as input into the process, as long as not counted under O7:

The company does not recover solvent on-site.

2.2 Determination of the environmental significance of the fugitive emissions

As suggested in Schedule 6 of the Regulations, the fugitive emission value obtained following the methodology outlined in this report will be expressed as a proportion of the input, which can be based on I1, as no solvent recovery or reuse is practiced at this facility. Therefore the total solvent input equals the quantity of solvent and their quantity purchased.

$$I = I1$$

Where:

- I1: The quantity of organic solvents or their quantity in preparation purchased which are used as inputs into the process in the time frame over which the mass balance is being calculated

3. Calculations

3.1 Determination of I1

The quantities of solvents/adhesives used in the manufacturing process during 2018 was calculated. MSDS's were reviewed so that the quantities of the solvents agreed for inclusion in the PER could be calculated.

The summary figures for the calculation of I1 are presented in the following table.

Solvent	Annual Usage (Tonnes)	TOC as C
Ethyl Acetate	161.385	88.028
Toluene	35.500	32.413
Hexane	2.606	2.182
Heptane	2.484	2.087
MEK	45.025	30.017
Total	247.000	154.727

$$I1 = 154.727$$

3.2 Determination of O1

Emission readings from the Thermal oxidiser were reviewed. The A1 RTO is 97.97% effective and the B1 RTO is 99.31% effective in treating all waste gases.

Released waste air represents 2.03% of all waste air from A1 RTO and 0.69% of all waste air from B1 RTO.

The readings taken from the thermal oxidiser for released air, **O1 = 0.819 tonnes**

3.3 Determination of O5

Quantity air emissions released from A1 RTO = 0.088
A1 Section of O5 = $(0.088 \times 97.97) / 2.03$
A1 Section of O5 = 4.247 tonnes

Quantity air emissions released from B1 RTO = 0.731
B1 Section of O5 = $(0.731 \times 99.31) / 0.69$
B1 Section of O5 = 105.211 tonnes

O5 = 109.458 tonnes

3.4 Determination of O6

As mentioned in Section 2.1, there were four types of waste stream containing solvents generated at the site in 2018:

- Solvent/adhesive waste
- Solvent waste
- Solvent contaminated solid waste
- Empty containers

3.4.1 Determination of Solvent, adhesive and waste solids

As mentioned in Section 2.1, the majority of waste streams sent off site for disposal are recorded and solvent concentration is calculated based on percentage of solvent in individual waste streams. The following figures, shown in section 3.4.3, relating to the organic content of the mentioned wastes, have been calculated on site.

3.4.2 Determination of residual waste in Empty containers.

The number of empty containers disposed of is recorded by the company as part of their environmental management system. As explained in Section 2.1, it is considered that the empty containers still hold 3% of their content when they are empty. The average weight of 200 Litre containers is 182kg (0.91kg/L), this figure is also used for 25, 30 and 60 Litre containers that were also disposed of during 2018.

Solvent residual waste in containers				
No Barrels	2956	37	10	4
Capacity of Barrels (L)	200	60	30	25
Residual Waste (%)	3	3	3	3
Kg/L	0.91	0.91	0.91	0.91
Total Residual Waste (kg)	16140	61	8	3

Total Residual Waste 16212 kg = 16.212 tonnes

3.4.3 Determination of Organic solvents contained in collected waste O6

	Ethyl Acetate	Toluene	Hexane	Heptane	MEK
Solvent in Waste (Solvent, Adhesives & Solids) (Tonnes)	22.170	5.281	0.182	0.175	11.445
Residual Waste in Empty Containers (Tonnes)	6.493	1.428	0.104	0.100	1.812
Total Waste (Tonnes)	28.663	6.709	0.286	0.275	13.257
Total Waste TOC as C (Tonnes)	15.634	6.126	0.239	0.231	8.838

Total Waste = 31.068 Tonnes = O6

3.5 Determination of F (Mass Balance)

As previously mentioned, the formula used to calculate the fugitive emissions is:

$$F = I1 - O1 - O5 - O6 - O7 - O8 = I1 - O1 - O5 - O6$$

$$F = 154.727 - 0.819 - 109.458 - 31.068 = 13.382$$

$$F\% = F/I = 13.382/154.727 = 8.65\% \text{ of solvent input}$$

4. Summary and Conclusions

All records regarding solvent consumption, emissions to atmosphere, and quantities of waste collected were readily available on site and in a form conducive to the completion of a mass balance.

The fugitive emission losses calculated in this mass balance was 8.65 % of the total solvent input. This is in compliance with the emission limit value of 20%.

Recommendations for the Solvent Management on-site:

- Continue to undertake test programme: The test programme will calculate an actual destruction efficiency of the thermal oxidiser. This will be used in future fugitive emission assessment -solvent management plans.

APPENDIX 3

WASTE MANAGEMENT RECORD

Validation Successful

There are no data validation errors on this page.

[Eden \(https://link.edenireland.ie:443/PortalHome/0\)](https://link.edenireland.ie:443/PortalHome/0) / Environmental Performance Reporting

Environmental Performance Report

Profile No: P0452 Reporting Year: 2018 Report ID: LRD0005282

Organisation (/Am/EnvironmentalPerformanceReports/EPROrganisation/Index/f0280d69-f629-e911-a2de-0050568a66b2)	Site (/Am/EnvironmentalPerform
---	--

Final Treatment of Waste Generated Onsite (/Am/EnvironmentalPerformanceReports/Waste/EPRWasteGeneratedOnsiteFinalTreatment/Index/f0280d69-f629-e911-a2de-0050568a66b2)

Transfers of Waste Generated Onsite è

During the reporting year, did you generate waste at your facility which you (then) transferred offsite for recovery/disposal?

Yes No

Show entries

Search...

Transferred Waste			
List of Waste (LoW)		Next Destination	Final Destination
LoW Code	LoW Description	Quantity of waste Tonnes / year	Classification
è		è	è
		Organisation	Organisation
		Waste Treatment Operation	Waste Treatment Operation
		Actions	Actions

Transferred Waste

List of Waste (LoW)			Next Destination		Final Destination			
LoW Code	LoW Description	Classification	Quantity of waste Tonnes / year	Organisation	Waste Treatment Operation	Organisation	Waste Treatment Operation	Actions
200301B	Municipal mixed residual non-household	-	123.63	Starrus Eco Holdings Limited (Dock Road) - W0082	R01 - Use principally as a fuel or other means to generate energy	-		Ë y L
200301B	Municipal mixed residual non-household	-	28.90	Starrus Eco Holdings Limited (Dock Road) - W0082	R03 - Recycling/reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes)	-		Ë y L
200139	Plastics	-	135.34	Starrus Eco Holdings Limited (Dock Road) - W0082	R01 - Use principally as a fuel or other means to generate energy	-		Ë y L
080409*	waste adhesives and sealants containing organic solvents or other hazardous substances	Hazardous	0.12	Indaver Ireland Limited (Tolka Quay Road), Dublin Port - W0036	D15 - Storage pending any of the operations numbered D 1 to D 14 (excluding temporary storage, pending collection, on the site where the waste is produced)	Indaver Antwerpen nv	D10 - Incineration on land	Ë y L

List of Waste (LoW)			Next Destination		Final Destination		
LoW Code	LoW Description	Classification	Quantity of waste Tonnes / year	Organisation	Waste Treatment Operation	Waste Treatment Operation	
08 04 09*	waste adhesives and sealants containing organic solvents or other hazardous substances	Hazardous	6.94	Indaver Ireland Limited (Tolka Quay Road), Dublin Port - W0036	D15 - Storage pending any of the operations numbered D 1 to D 14 (excluding temporary storage, pending collection, on the site where the waste is produced)	Fortum Waste Solutions A/S D10 - Incineration on land	E y L
08 04 09*	waste adhesives and sealants containing organic solvents or other hazardous substances	Hazardous	43.29	Indaver Ireland Limited (Tolka Quay Road), Dublin Port - W0036	R13 - Storage of waste pending any of the operations numbered R 1 to R 12 (excluding temporary storage, pending collection, on the site where the waste is produced)	ATM BV R12 - Exchange of waste for submission to any of the operations numbered R 1 to R 11	E y L
08 04 09*	waste adhesives and sealants containing organic solvents or other hazardous substances	Hazardous	0.76	Indaver Ireland Limited (Tolka Quay Road), Dublin Port - W0036	R13 - Storage of waste pending any of the operations numbered R 1 to R 12 (excluding temporary storage, pending collection, on the site where the waste is produced)	ATM BV R12 - Exchange of waste for submission to any of the operations numbered R 1 to R 11	E y L

Transferred Waste

List of Waste (LoW)		Next Destination		Final Destination			
LoW Code	LoW Description	Classification	Quantity of waste of Tonnes / year	Organisation	Waste Treatment Operation	Waste Treatment Operation	Actions
08 04 09*	waste adhesives and sealants containing organic solvents or other hazardous substances	Hazardous	0.35	Indaver Ireland Limited (Tolka Quay Road), Dublin Port - W0036	R13 - Storage of waste pending any of the operations numbered R 1 to R 12 (excluding temporary storage, pending collection, on the site where the waste is produced)	R12 - Exchange of waste for submission to any of the operations numbered R 1 to R 11	É Y L
08 04 09*	waste adhesives and sealants containing organic solvents or other hazardous substances	Hazardous	2.23	Soltec (Ireland) Limited - W0115	R02 - Solvent reclamation/regeneration		É Y L
15 01 03	wooden packaging	-	32.75	Quitmann O'Neill Packaging Limited	R03 - Recycling/reclamation of organic substances which are not used as solvents (including composting and other biological transformation processes)		É Y L

Transferred Waste

List of Waste (LoW)			Next Destination		Final Destination	
LoW Code	LoW Description	Classification	Quantity of waste Tonnes / year	Organisation	Waste Treatment Operation	Waste Treatment Operation
15 02 02*	absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by hazardous substances	Hazardous	0.43	Indaver Ireland Limited (Tolka Quay Road), Dublin Port - W0036	D15 - Storage pending any of the operations numbered D 1 to D 14 (excluding temporary storage, pending collection, on the site where the waste is produced)	D10 - Incineration on land
15 02 02*	absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by hazardous substances	Hazardous	11.22	Indaver Ireland Limited (Tolka Quay Road), Dublin Port - W0036	R13 - Storage of waste pending any of the operations numbered R 1 to R 12 (excluding temporary storage, pending collection, on the site where the waste is produced)	R01 - Use principally as a fuel or other means to generate energy

Transferred Waste

List of Waste (LoW)		Next Destination		Final Destination				
LoW Code	LoW Description	Classification	Quantity of waste Tonnes / year	Organisation	Waste Treatment Operation	Organisation	Waste Treatment Operation	Actions
15 02 02*	absorbents, filter materials (including oil filters not otherwise specified), wiping cloths, protective clothing contaminated by hazardous substances	Hazardous	3.58	Indaver Ireland Limited (Tolka Quay Road), Dublin Port - W0036	R13 - Storage of waste pending any of the operations numbered R 1 to R 12 (excluding temporary storage, pending collection, on the site where the waste is produced)	ATM BV	R12 - Exchange of waste for submission to any of the operations numbered R 1 to R 11	É y L
16 02 13* E	Non-household other waste electrical and electronic equipment, hazardous	Hazardous	0.39	Rehab Industries	R04 - Recycling/reclamation of metals and metal compounds	-		É y L

List of Waste (LoW)			Next Destination		Final Destination		
LoW Code	LoW Description	Classification	Quantity of waste Tonnes / year	Organisation	Waste Treatment Operation	Waste Treatment Operation	
16 03 05*	organic wastes containing hazardous substances	Hazardous	0.34	Indaver Ireland Limited (Tolka Quay Road), Dublin Port - W0036	D15 - Storage pending any of the operations numbered D 1 to D 14 (excluding temporary storage, pending collection, on the site where the waste is produced)	Indaver Antwerpen nv D10 - Incineration on land	É y L
13 02 08*	other engine, gear and lubricating oils	Hazardous	0.20	Envia Ireland Limited (Portlaoise) - W0184	R09 - Oil re-refining or other reuses of oil	-	É y L
16 05 06*	laboratory chemicals, consisting of or containing hazardous substances, including mixtures of laboratory chemicals	Hazardous	0.12	Indaver Ireland Limited (Tolka Quay Road), Dublin Port - W0036	D15 - Storage pending any of the operations numbered D 1 to D 14 (excluding temporary storage, pending collection, on the site where the waste is produced)	Indaver Antwerpen nv D10 - Incineration on land	É y L

Transferred Waste

List of Waste (LoW)			Next Destination		Final Destination	
LoW Code	LoW Description	Classification	Quantity of waste Tonnes / year	Organisation	Waste Treatment Operation	Waste Treatment Operation
16 05 06*	laboratory chemicals, consisting of or containing hazardous substances, including mixtures of laboratory chemicals	Hazardous	0.00	Indaver Ireland Limited (Tolka Quay Road), Dublin Port - W0036	D15 - Storage pending any of the operations numbered D 1 to D 14 (excluding temporary storage, pending collection, on the site where the waste is produced)	D10 - Incineration on land
20 01 33*	batteries and accumulators included in 16 06 01, 16 06 02 or 16 06 03 and unsorted batteries and accumulators containing these batteries	Hazardous	0.05	KMK Metals Recycling Limited - W0113	R04 - Recycling/reclamation of metals and metal compounds	

List of Waste (LoW)			Next Destination		Final Destination		
LoW Code	LoW Description	Classification	Quantity of waste / Tonnes / year	Organisation	Waste Treatment Operation	Waste Treatment Operation	
16 03 03*	inorganic wastes containing hazardous substances	Hazardous	0.01	Indaver Ireland Limited (Tolka Quay Road), Dublin Port - W0036	D15 - Storage pending any of the operations numbered D 1 to D 14 (excluding temporary storage, pending collection, on the site where the waste is produced)	Indaver Antwerpen nv D10 - Incineration on land	É Y L
06 04 04*	wastes containing mercury	Hazardous	0.01	Irish Lamp Recycling Co. Ltd.	R04 - Recycling/reclamation of metals and metal compounds	-	É Y L
15 01 10*	packaging containing residues of or contaminated by hazardous substances	Hazardous	53.29	Rilta Environmental Limited - W0192	R04 - Recycling/reclamation of metals and metal compounds	-	É Y L

Showing 1 to 22 of 22 entries.

o Add New Waste Item

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