Annual Solvent Management Plan covering 2022

The following document has been generated in line with the requirements of Schedule 14 of the Environmental Permitting Regulations (EPR) - Solvent emission activities, and by extension the relevant sections of the Industrial Emissions Directive (IED). Note that we continue to maintain compliance with the EU IED as a UK-specific version has not yet been made available. The aim of this plan is to demonstrate compliance with this legislation, and as such to meet the requirement in section 4.2.5 of permit BV7460ID.

Contents

1 Solvent usage at Nexperia Newport Ltd

Solvents are used in the manufacture of wafer products in a number of different ways:

Surface treatments (inc. associated equipment cleaning)	**Not surface treatments**
Photosensitive resists**	Cleaning processes (general, not associated with surface treatments)
Product cleaning processes*	Emergency power backup/fire pump operation (diesel)
Passivation layering**	
Drying processes*/**	Coolants and lubrication
Etching processes*	

*surface cleaning as per IED **coating activity as per IED

1.1 Process Solvent

Process solvent containers are delivered in 0.1L to 1,000L containers and are held in dedicated bunded storage locations across the site. The larger containers (i.e. ≥100L) are sealed units which are backfilled with nitrogen as the contents are depleted in order to maintain the ultra-high purity of the solvent.

Empty drums are resealed ensuring no fugitive emissions from this source, and are held in a bunded storage yard prior to collection and reuse by the supplier, or in the dedicated waste storage compound to be recycled or disposed of by the contract waste provider.

1.2 Waste solvent

Solvent waste is kept separate from other trade effluent via the use of a separate drainage system. This network takes the waste from the tools and deposits it in bunded storage vessels, from which it is then taken away via tanker by a specialist contractor.

Fab 11 uses two dedicated pressure-rated solvent waste storage fixed tanks with conservation vents such that minimal emissions are released during filling. The Storage tanks are provided with magnetic level gauges and high-level alarm sensors connected to the on-site building management system (BMS). In the event an alarm is triggered, notifications are automatically sent out to Facilities Technicians and the Environmental Engineers. The tanks are connected and work in tandem in order to maximise storage space, thus reducing collection frequency. Transfer to the waste tanker is undertaken via a back venting system with lockable tanker connection, minimising emissions to atmosphere.

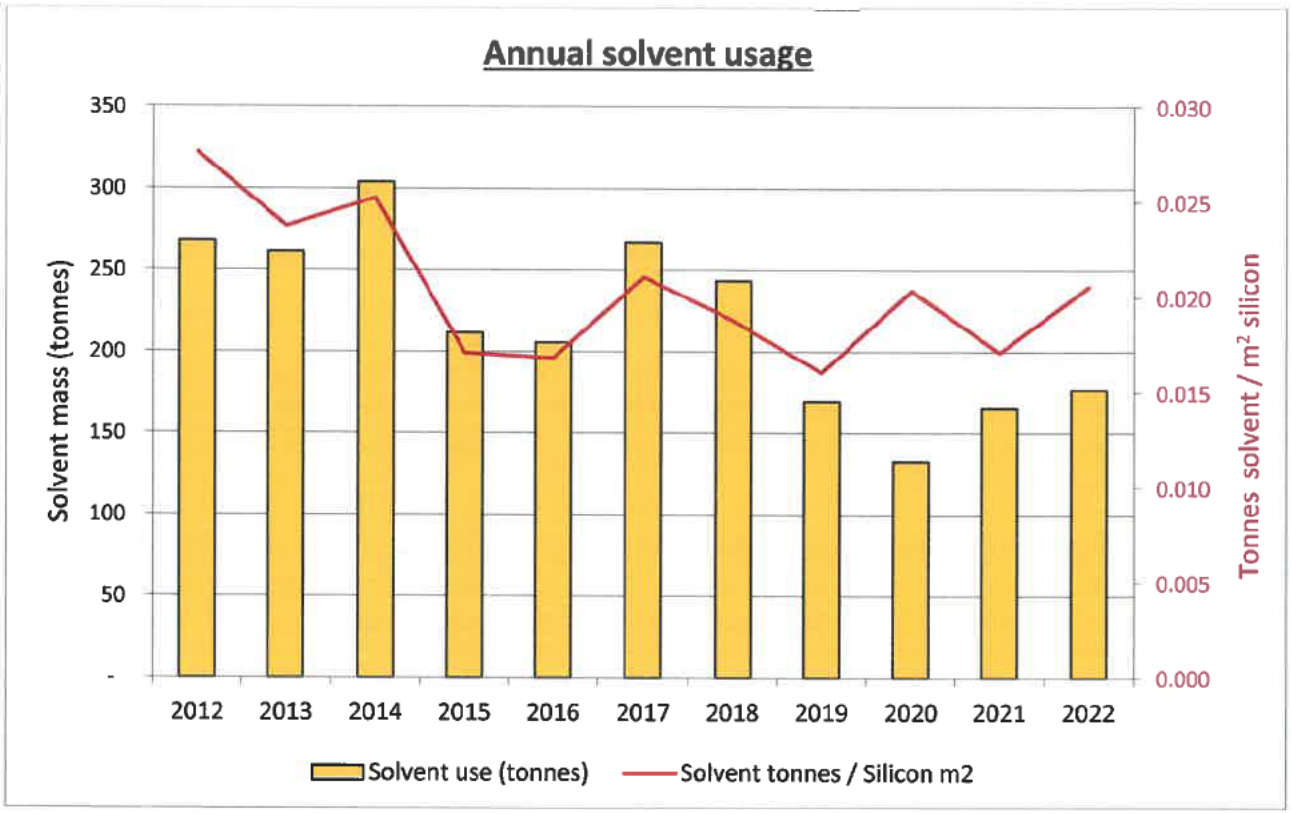
Fab 10 North has two fixed tanks in a below-ground bunded area. Waste solvent is subsequently pumped to two above ground IBCs via double diaphragm pumps. A 1½ inch diameter filling pipe passes through the cap of the IBC; the gap between the pipe and the cap is made as small as possible to minimise emissions. The IBC caps are only open while their content is transferred to the off haul tanker. Due to the current usage status of Fab 10 N, this area is not in regular use and is maintained solely as an 'overflow' area for emergency use.

Fab 10 South has one fixed solvent tank (with two internal chambers) located below ground within a bunded area. The waste solvent is transferred via ½" double diaphragm pumps to two above ground stainless steel tanks which equalise to atmosphere via a small activated carbon scrubber. The stainless steel tanks are emptied by transfer to an off haul tanker via a back venting system with lockable tanker connection, ensuring minimal emissions to atmosphere.
For additional solvent waste storage capacity if the vented stainless steel tanks were to become full, there are two $1m^3$ IBCs. A 1½ inch diameter filling pipe passes through the cap of the IBC; the gap between the pipe and the cap is made as small as possible to minimise emissions.The IBCs caps are only open while their content is transferred to the tanker; this takes approximately five minutes per IBC and happens approximately every 4 weeks.

All solvent tanks, bunds and pipework are visually inspected on a weekly basis, with a more detailed inspection undertaken monthly by an external contractor as part of our planned maintenance programme.

1.3 2022 usage and disposal status

Total quantity of solvent used in 2022 was 7% higher than in 2021, and tankered waste solvent (including water added during manufacturing processes) increased by 25%. The graph below shows the trend in both over the past 10 years.



17 new production tools have been installed since Nexperia took full ownership of the Newport site. In addition to this, throughout CY2022, the split of manufacturing output has shifted from the Infineon legacy products to more Nexperia products. The processes and chemicals used have remained the same save for some minor changes (slightly different solvents with better efficacy for example), however Nexperia products are more complex than Infineon legacy products and this has translated to a slight decrease in m^2 silicon output and an increase in number of layers and steps for a single wafer. For every additional layer, an additional photolithography process is run, resulting in an increase in solvent use.

The method of solvent waste collection was the same as in previous years (via tanker approx. every 4-5 weeks), there have been no emergency incidents involving solvents. We therefore believe our fugitive solvent emissions as a percentage of solvent used remain below 5%.

2 Demonstrating IED and EPR compliance

The operations schedule in Nexperia Newport Ltd permit includes the following permitted activity relating to solvent use:

EPR section	Activity
6.4 – Coating activities, printing and textile treatments	Part A(2) - (a) Unless falling within Part A(1) of this Section, surface treating substances, objects or products using organic solvents, in particular for dressing, printing, coating, degreasing, waterproofing, sizing, painting, cleaning or impregnating, in plant with a consumption capacity of more than 150kg or more per hour than 200 tonnes per year.

Even though our product mix each year can mean that we may be under this consumption level in a given year, our site has the *capacity* to consume >150kg/hr or 200tonnes/year of organic solvents which is why this requirements continuously applies.

Schedule 14 of the Environmental Permitting Regulations 2016 (as amended) (Solvent emission activities) lists which parts of the Industrial Emissions Directive apply to this activity. The following table lists these, and provides brief descriptions of how we comply:

Article(s)	Article title	How does Nexperia Newport Ltd comply?
CHAPTER I – COMMON PROVISIONS		
5(1) & (3)	Granting of a permit	By ensuring we continue to have an environmental permit, and follow the correct procedures for updating our permit should we make any changes to our operations
7	Incidents and accidents	We notify NRW immediately in the event of an incident, take measures to limit the consequences & prevent further incidents
8 (2)	Non-compliance	We will immediately notify NRW if we fail to comply with permit conditions & remedy the issue ASAP to restore compliance. If the permit breach could cause an immediate adverse health or environmental effect we will suspend the relevant activity
9	Emission of greenhouse gases	Minimal specific requirement for Nexperia Newport Ltd, instead puts requirements on NRW
CHAPTER V – SPECIAL PROVISIONS FOR INSTALLATIONS AND ACTIVITIES USING ORGANIC SOLVENTS		
57	Definitions	By ensuring that appropriate personnel understand relevant definitions (including our own staff, as well as anyone we work with to support us with permitting requirements)

Article(s)	Article title	How does Nexperia Newport Ltd comply?
58	Substitution of hazardous substances	Replace any substances or mixtures which, because of their content of volatile organic compounds classified as carcinogens, mutagens, or toxic to reproduction under Regulation (EC) No 1272/2008, are assigned or need to carry the hazard statements H340, H350, H350i, H360D or H360F within the shortest possible time. Maintain relationships with solvent suppliers such that removal of these substances can be achieved where possible.
59 (except 59 (4))	Control of emissions	Comply with Annex VII of IED. Provide necessary information to the regulator as requested to allow them to show that we are in compliance with emission limits. See section 2.1 of this document for further information ref 59(5) in particular
60	Monitoring of emissions	Minimal specific requirement for Nexperia Newport Ltd, instead puts requirements on NRW
61	Compliance with emission limit values	Comply with conditions set out in Part 8 of Annex VII – see section 2.1 of this document for further information
62	Reporting on compliance	We will supply NRW, on request, with data enabling the competent authority to verify compliance with either of the following: (a) emission limit values in waste gases, fugitive emission limit values and total emission limit values; (b) the requirements of the reduction scheme under Part 5 of Annex VII; (c) the derogations granted in accordance with Article 59(2) and (3). This may include a solvent management plan prepared in accordance with Part 7 of Annex VII, if requested by NRW (this document, currently item 4.2.5 of BV7460ID)
63	Substantial change to existing installations	10% change in solvent input averaged over a day counts as a substantial change. Will inform NRW of any planned change, which may trigger a review against the requirements of the IED
65	Access to information	Understood that this report must be made available to the public (i.e. on NRW's Public Register)
82 (7), (8) & (9)	Transitional provisions	Comply with articles from the following dates: (7) - Article 58 applies from 1st June 2015 (8) - Article 59(5) applies from 1st June 2015 (9) - Point 2 of Part 4 of Annex VII shall apply from 1 June 2015

2.1 Compliance with Annex VII of the IED

Part 1 provides information on which activities are relevant, including definitions. The table below shows the activities relevant to Nexperia Newport Ltd, as well as the related thresholds and emission limit values from Part 2 of Annex VII:

No.	**Activity (solvent consumption threshold in tonnes/year)**	**Threshold** (solvent consumption threshold in tonnes/year)	**Emission limit values in waste gases** (mg C/Nm³)	**Fugitive emission limit values** (percentage of solvent input)	**Special provisions**
4	Surface cleaning using compounds specified in Article 59(5). (> 1)	1—5 > 5	20 (1) 20 (1)	15 10	(1) Limit value refers to mass of compounds in mg/Nm³, and not to total carbon.
5	Other surface cleaning (>2)	2-10 >10	75(1) 75(1)	20(1) 15(1)	(1) Installations which demonstrate to the competent authority that the average organic solvent content of all cleaning material used does not exceed 30% by weight are exempt from application of these values.
8	Other coating, including metal, plastic, textile (5), fabric, film and paper coating (>5)	5-15 >15	100 (1) (4) 50/75 (2) (3) (4)	25(4) 20(4)	(1) Emission limit value applies to coating application and drying processes operated under contained conditions. (2) The first emission limit value applies to drying processes, the second to coating application processes. (3) For textile coating installations which use techniques which allow reuse of recovered solvents, the emission limit value applied to coating application and drying processes taken together shall be 150. (4) Coating activities which cannot be carried out under contained conditions (such as shipbuilding, aircraft painting) may be exempted from these values, in accordance with Article 59(3). (5) Rotary screen printing on textile is covered by activity No 3.

In October 2022, MCERTs compliant sampling was carried out on the solvent emission stacks for both Fab 10 and Fab 11 (EPR permit emission point references A1 & A10 respectively), providing total solvent emission readings in mg/Nm³. For each of the above activities, the total associated solvent usage in CY2022 (kg) was compared to the total usage (split per building) to provide a percentage figure. This percentage was then applied to the emission reading for the relevant stack to provide a total emission rate for each activity, thus allowing for a comparison against the emission limit values. See section 1.3 of this document for information on fugitive emissions.
It was found that for 2022 all emissions were within IED limits.

Part 3 of IED Annex VII is not applicable to Nexperia Newport Ltd (applies to the vehicle coating industry).

Part 4 refers to substances which bear the following hazard statements:

Code	Hazard Statements	Hazard Class	Category	Pictogram	Signal Word
H340	May cause genetic defects	Germ cell mutagenicity	1A, 1B		Danger
H350	May cause cancer	Carcinogenicity	1A, 1B		Danger
H350i	May cause cancer by inhalation	Carcinogenicity	1A, 1B		Danger
H360D	May damage fertility or the unborn child	Reproductive toxicity	1A, 1B		Danger
H360F	May damage fertility	Reproductive toxicity	1A, 1B		Danger
H341 (halogenated VOCs only)	Suspected of causing genetic defects	Germ cell mutagenicity	2		Warning
H351 (halogenated VOCs only)	Suspected of causing cancer	Carcinogenicity	2		Warning

In 2022 there were a total of three solvents used on site which carried one or more of these hazard statements. One of these is diesel used for backup generators and a fire sprinkler pump. One is new to site. In 2021 there were a total of six solvents listed as carrying these hazard statements, but it has since been clarified that for three of these the relevant hazard statements apply to *constituents of the product* (in concentrations of a maximum of 0.3%) but *not the final product purchased by Nexperia.*
The remaining solvents in use which bear these hazard symbols are understood to currently have no alternative available; we will continue to work with suppliers to seek alternative options & encourage the removal of substances of concern where possible.

Part 5 does not apply to Nexperia Newport Ltd (relates to Reduction Schemes).

Part 6 references emission monitoring. Nexperia Newport Ltd carries out MCERTS-compliant solvent stack emission sampling once per calendar year, using a external specialist contractor. Other than this review, annual PRTR reports are the only time when solvent sampling results are required (there are no limits set in permit BV7460ID for solvent emissions) and as such it is our opinion that any additional testing would be an unwarranted expense.

Part 7 states the requirements for a solvent management plan – this document.

Part 8 further defines how emission limit values shall be considered to be compliant.

3 Conclusion

Based on the information presented across this document, Nexperia Newport Ltd believes that its solvent-related operations comply with the requirements of the Industrial Emissions Directive, and by extension our site is in compliance with section 4.2.5 of permit BV7460ID.

Signed on behalf of Nexperia Newport Ltd:

Name: [redacted]

Position: Facilities & EHS Director

Signature: [redacted]

Date: 20/1/22