COCIR
SUSTAINABLE COMPETENCE IN ADVANCING HEALTHCARE
European Coordination Committee of the Radiological, Electromedical and Healthcare IT Industry

Exemption Request Form

Date of submission: **17 July 2018**

1. Name and contact details

1) Name and contact details of applicant:

Company:	**COCIR**	Tel.:	**003227068966**
Name:	**Riccardo Corridori**	E-Mail:	**corridori@cocir.org**
Function:	**EHS Senior Manager**	Address:	**Blvd A Reyers 80, 1030 Bruxelles**

2) Name and contact details of responsible person for this application (if different from above):

Company:	_____	Tel.:	_____
Name:	_____	E-Mail:	_____
Function:	_____	Address:	_____

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2. Reason for application:

Please indicate where relevant:

- ☒ Request for new exemption in: Annex IV
- ☐ Request for amendment of existing exemption in
- ☐ Request for extension of existing exemption in
- ☐ Request for deletion of existing exemption in:
- ☐ Provision of information referring to an existing specific exemption in:
  - ☐ Annex III ☐ Annex IV

No. of exemption in Annex III or IV where applicable: _____

Proposed or existing wording: **Bis (ethylhexyl)-phthalate (DEHP) in ion selective electrodes for point of care analysis of ionic substances in human body fluids**

Duration where applicable: Maximum validity period

- ☐ Other: _____

3. Summary of the exemption request / revocation request

DEHP is an essential component of medical IVD analysers for the measurement of specific substances in body fluids.

DEHP is used as an essential component of ion selective electrode membranes that are used in point of care analysers used to measure the concentrations of sodium and potassium ions, pH and pCO2 in whole blood and in other fluids

Measurements must be available within one minute as this is essential for point of care situations such as accident and emergency departments and in operating theatres. This exemption is needed because alternatives to DEHP have been found to give less accurate and incorrect test results and alternative methods to ion selective electrodes are much too slow and may also give inaccurate results.

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4. Technical description of the exemption request / revocation request

(A) Description of the concerned application:

1. To which EEE is the exemption request/information relevant?

a. Name of applications or products: Chemical analysis of blood gases, electrolytes, metabolites, total hemoglobin, and hemoglobin derivatives in arterial and venous whole blood samples, dialysate and other body fluids such as pleural fluids. List of relevant categories: (mark more than one where applicable)

☐ 1	☐ 7
☐ 2	☒ 8
☐ 3	☐ 9
☐ 4	☐ 10
☐ 5	☐ 11
☐ 6	

b. Please specify if application is in use in other categories to which the exemption request does not refer: _____

c. Please specify for equipment of category 8 and 9:

The requested exemption will be applied in

☐ monitoring and control instruments in industry

☒ in-vitro diagnostics

☐ other medical devices or other monitoring and control instruments than those in industry

2. Which of the six substances is in use in the application/product?
   (Indicate more than one where applicable)
   ☐ Pb ☐ Cd ☐ Hg ☐ Cr-VI ☐ PBB ☐ PBDE
   ☒ DEHP

3. Function of the substance: DEHP is used as a membrane solvent for the ion selective electrode constituents.

4. Content of substance in homogeneous material (%weight): typically about 70 wt% in the membrane

5. Amount of substance entering the EU market annually through application for which the exemption is requested: 2.2 kilograms per year in the EU

   Please supply information and calculations to support stated figure.
   This is confidential and so is provided in a separate confidential document

6. Name of material/component: Bis (ethylhexyl)-phthalate (DEHP)

7. Environmental Assessment: _____
   LCA: ☐ Yes
   ☒ No

(B) In which material and/or component is the RoHS-regulated substance used, for which you request the exemption or its revocation? What is the function of this material or component?

Medical personnel in emergency departments, intensive care units (ICU), neonatal units and in operating theatres (OR) often need to rapidly analyse various fluids of their patients, including pleural fluid, blood and dialysate. These situations are referred to as "point of care" and analysis is usually needed within a few minutes and so point of care testing requires for a much shorter time to obtain results compared to traditional laboratory testing. Faster analysis results enable quicker therapeutic intervention which improves patient outcomes and can make the difference that enables a seriously ill patient to survive. It has been extensively shown that rapid turn-around time to results is crucial in critical care environments and has been shown to improve patient outcome over that of other methodologies[1].

In an emergency situation such as in emergency departments, intensive care units (ICU), neonatal units and in operating theatres, analysis is needed within the shortest possible time and preferably within a few minutes and only certain designs of analyser are able to achieve

[1] The National Academy of Clinical Biochemistry Laboratory Medicine Practice Guideline: Evidence-based practice for point-of-care testing. Nichols, J.H. et al; Clinica Chimica Acta 379 (2007) 14–28)

these analysis times. In hospitals, devices can analyse for cations such as potassium, sodium, calcium and pH (H^+) and the partial pressure of carbon dioxide (pCO2) in blood and other body fluids using an ion selective electrode within about 1 minute. One example product on the EU market can analyse, simultaneously within one minute:

- Partial pressure of carbon dioxide (pCO2)
- Partial pressure of oxygen (pO2)
- pH
- Sodium
- Potassium
- Ionized calcium
- Chloride
- Glucose
- Total hemoglobin and fractions: fO2Hb, fCOHb, fMetHb, fHHb
- Neonatal bilirubin
- Lactate

Of these analytes, this instrument analyses sodium, potassium, pH and pCO2 using DEHP-containing membranes with ion selective electrodes, although ion selective electrodes can also be used to analyse other ionic materials. An important time saving requirement is that the analyser can analyse whole blood without first having to separate it into plasma and cells by centrifuging. This saves valuable time in emergency situations. Another important requirement is that the analyser should use very small samples of blood to reduce the need for transfusions. The number of transfusions has been shown to be an independent predictor of increased hospital length of stay and mortality[2].

The alternative is for the sample to be sent to a hospital's central laboratory where it joins a queue before analysis is carried out. One study found that hospital's central laboratories can take over two hours, which is unacceptable in an emergency situation[3], whereas point of care analysers can give results in less than five minutes. The analysis of pCO2 and pH must be done within minutes as the gas value and pH change rapidly and so cannot be sent to the central lab. In addition the measurement must be made on whole blood and central lab systems measure serum so that the sample is destroyed.

In addition, central lab systems use an indirect method of measuring these ions whereas blood gas systems measure them directly. Indirect methods are well known to give inaccurate results. For example, cases of pseudohyponatremia (where an incorrect low sodium

[2] Journal of Hospital Medicine 2013;8:506–512

[3] https://www.pointofcare.abbott/int/en/offerings/istat/istat-handheld

concentration is measured when it is actually normal) have been reported which can lead to misdiagnosis and patient harm[4].

Ion selective electrodes (ISE) for analysis of ions in blood or other body fluids are supplied to hospitals as components of disposable cartridges that also contain the chemicals used for analysis and carry out measurement, washing and waste disposal, aqueous quality controls and electronics. Some instruments have separate cartridges for measurement, wash/waste and automatic aqueous quality control.

The measurement cartridge is a device that contains all the sensors used to make the measurements, liquid reagents to calibrate the sensors over its use-lifetime, a linear sampling valve with sample port that accepts a syringe or capillary and tubing to route the reagents and patient's samples. The sensors are housed in a sensor module. The reagents are contained in foil laminated bags.

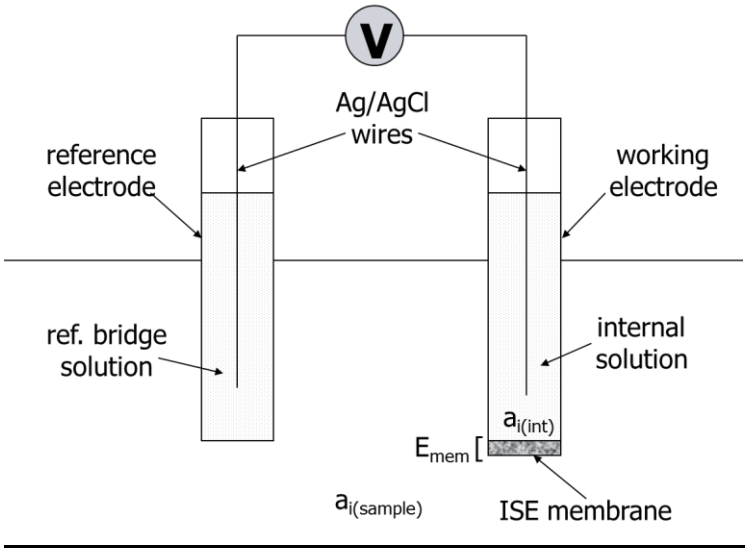
These are regarded as consumables as they are disposed of when the chemicals are consumed, after a fixed period of time (e.g. 28 days) or after a specific number of samples have been analysed (e.g. 750). When cartridges are replaced, the replacements take time to equilibrate and before accurate results can be obtained. In point of care situations, this time period must be as short as possible and this can be a short as 25 minutes with some instruments.

The cartridges must however be compatible with the analyser that it is attached as the analysis results generated by the analyser use mathematical formulas which are specifically designed for the integrated sensors. For example, there is lot-specific data collected during manufacturing that are stored on the cartridge. When the cartridge is installed, the analyser reads that lot-specific data and is used in the mathematical formulas to generate a clinical result. Many EU hospitals already own or will buy before 21 July 2021 analysers that utilise ISE cartridges that contain DEHP. These hospitals cannot use different cartridges designed for different instruments to the one that they are designed, as either they cannot be attached and would give incorrect results.

Ion selective electrodes measure the activity of ions. The sensors operate on the potentiometric principle where the ISE half-cell potential, relative to a reference sensor, is proportional to the log of the analyte activity. In general, the membranes contain 29wt% Polyvinyl Chloride (PVC), 70wt% DEHP and an ionophore that imparts specificity for the particular ion of interest. For example, the Potassium sensor utilizes the Valinomycin ionophore that has high specificity for potassium cations over all other cations in whole blood. Potassium cation is complexed by the ionophore at the sample membrane phase boundry establishing a phase boundry potential. This potential is measured relative to a reference electrode that is also in contact with the sample (see block diagram of conventional ISE cell

[4] Arch Pathol Lab Med., Vol 135, April 2011 and https://acutecaretesting.org/en/articles/pseudohyponatremia

below). The total cell potential can be related to the ion activity through the Nernst Equation (below)



$$E = E^{o} + \frac{RT}{nF}\log\frac{a_{sample}}{a_{IE}}$$

Figure 1. Diagram of electrochemical cell used for ion selective electrodes and Nernst equation.

(C) What are the particular characteristics and functions of the RoHS-regulated substance that require its use in this material or component?

All of the following are required

- Must be able to analyse whole blood directly
- Must not affect stability of electrodes or membrane during use or in storage
- Cartridges must be compatible with analysers already on the market and in use within EU hospitals
- Give analysis results within as short a time as possible, ideally within one minute.
- Change-over time to replace used cartridges should be as short as possible, ideally, less than 30 minutes.
- The plasticiser must have the following properties:
  - Be a liquid over a wide range of temperatures
  - Be compatible with, and solvate the other membrane components
  - Not induce phase separation
  - Not exhibit crystallization
  - Be lipophilic so that it does not leach from the membrane during use

5. Information on Possible preparation for reuse or recycling of waste from EEE and on provisions for appropriate treatment of waste

1) Please indicate if a closed loop system exist for EEE waste of application exists and provide information of its characteristics (method of collection to ensure closed loop, method of treatment, etc.)

No.

2) Please indicate where relevant:

☐ Article is collected and sent without dismantling for recycling
☐ Article is collected and completely refurbished for reuse
☐ Article is collected and dismantled:
  ☐ The following parts are refurbished for use as spare parts: _____
  ☐ The following parts are subsequently recycled: _____
☒ Article cannot be recycled and is therefore:
  ☒ Sent for energy return – Electrodes and membranes become bio-hazards when used so are excluded from the WEEE Directive
  ☐ Landfilled

3) Please provide information concerning the amount (weight) of RoHS substance present in EEE waste accumulates per annum:

☐ In articles which are refurbished _____
☐ In articles which are recycled _____
☒ In articles which are sent for energy return ca. 2 kg per year
☐ In articles which are landfilled _____

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6. Analysis of possible alternative substances

(A) Please provide information if possible alternative applications or alternatives for use of RoHS substances in application exist. Please elaborate analysis on a life-cycle basis, including where available information about independent research, peer-review studies development activities undertaken

Several potential substitutes could be considered, but are all technically impractical as explained below.

Alternative plasticisers

Several manufacturers of IVD ion selective electrodes (ISE) have attempted to replace DEHP with alternative substances with similar properties. However, this showed that none are drop-in replacements and all give different behaviour which results in incorrect analysis. To achieve the characteristics above, the plasticizer needs alkyl (e.g. ethylhexyl-) and or aryl functional groups and links or substitutions for enough polar or polarizable groups. However, these must

be balanced such that the plasticizer does not compete with the ionophore in complexing the ion of interest[5].

Manufacturers' tests with a variety of alternative plasticisers including similar phthalates all gave different behaviour and one manufacturer's results are described below in section 7A.

Research by manufacturers has shown that current models of analyser have to use the current design of ion selective electrode cartridges that contains DEHP. EU hospitals that already own and use these analysers will continue to need to buy cartridges that contain DEHP-membrane ISEs as consumables for the foreseeable future to be able to continue to carry out rapid point of care analysis. These analysers are planned to be sold in the EU until alternative technology (described in section 7) is developed which is expected to be after 21 July 2021. Therefore this exemption will be needed for new analysers sold after 21 July 2021 as well as for consumable ion selective electrode modules that are supplied to hospitals in the EU to use with these analysers. Note that the ISE consumable packs are in scope of RoHS as they are not replacements for repair, upgrade or capacity expansion of electrical equipment, so are not excluded from the scope of RoHS.

Alternative analysis methods

Ion chromatography: This is a technique where an aqueous solution is passed through a special column[6] that separates ions by their migration rate using a carrier solution. Standards that contain known quantities of the ions to be analysed are used to calibrate the instrument so that the migration time for each ion and their concentrations can be calculated. This method is a laboratory based technique that requires a skilled operator. Analysis time is much longer than with ISE as this requires:

- Separation and removal of cells from blood
- Equilibration of instrument (the column has to be at a specific temperature so time in an oven is required to reach this)
- Calibration using standards - Calibration is always necessary as unlike with DEHP-ISE membranes, migration times tend to vary considerably.
- Analysis of body fluid such as urine or blood after cell removal
- Recalibration to compensate for drift in migration times and concentrations

The total time required is at least one hour and can be longer and requires the hospital worker to be with the analyser for most of this time. This is rarely possible at point of care situations where staff have very little time available to carry out analysis. This technique is suitable if there are many similar samples to analyse and which can be processed automatically with an auto-sampler in a hospital's central lab, but impractical in point of care situations. Other disadvantages of this technique are that it cannot measure pH and so this needs to be analysed by a different technique. Also, anions and cations are analysed using two different columns with different elution chemicals. Therefore Na+, K+ and Ca2+ is analysed with one

[5] Eugster R. et al; Anal Chim Acta 289 (1994) 1-13

[6] These typically are metal tubes with an internal coating of an ionically charged polymer that bonds weakly to ions.

column (taking at least one hour) and then bicarbonate (HCO_3^-) and other anions are analysed using a different column taking another hour (unless two ion chromatograph instruments are available).

Flame photometry for Ca^{2+}, Na^+ and K^+. This is another laboratory technique that requires removal of cells from whole blood before the aqueous phase can be analysed. The instrument must be pre-calibrated using standards and requires a skilled operator and so is not suitable for point of care situations where rapid analysis is needed. Also, separate analysis using a different method is needed for pH and pCO2 (bicarbonate ions).

Atomic adsorption spectroscopy is another laboratory-based analysis method suitable for Ca^{2+}, Na^+ and K^+, but not for pH or bicarbonate. This is a time consuming analysis method as each ion is analysed separately and standards for each ion have to be prepared and their response compared with that of the patient's sample. It is likely to take several hours to analyse one sample for Ca^{2+}, Na^+ and K^+ and so this technique is usually unsuitable in hospitals and is especially unsuitable in point-of-care.

Glass pH electrodes for pH. These are the standard method used to measure pH in laboratories, factories and for environmental analysis. This technique requires sufficient fluid to immerse the electrode which may sometimes be more than is available from a patient. In addition, transport of the sample into an open container will destroy the sample as exposure to the air will change the gas values which changes the pH.

Other limitations of all alternative techniques

It is critical to note that Ion chromatography, Flame Photometry and Atomic Adsorption Chromatography all yield the total concentration of the analyte. The physiological and clinical relevant result is only the ion activity, which is the portion which is ionized and free in the sample. For example, the normal total calcium in whole blood is approximately 2.5 mmol/l. However approximately 50% is complexed in the whole blood. Therefore only 1.25 mmol/l is ionized and this is the fraction that an ISE measures. It is this fraction that physicians base their clinical treatment decisions upon.

(B) Please provide information and data to establish reliability of possible substitutes of application and of RoHS materials in application

Results of comparative tests with alternatives to DEHP are included in section 7A. This does not appear to be a reliability issue.

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7. Proposed actions to develop possible substitutes

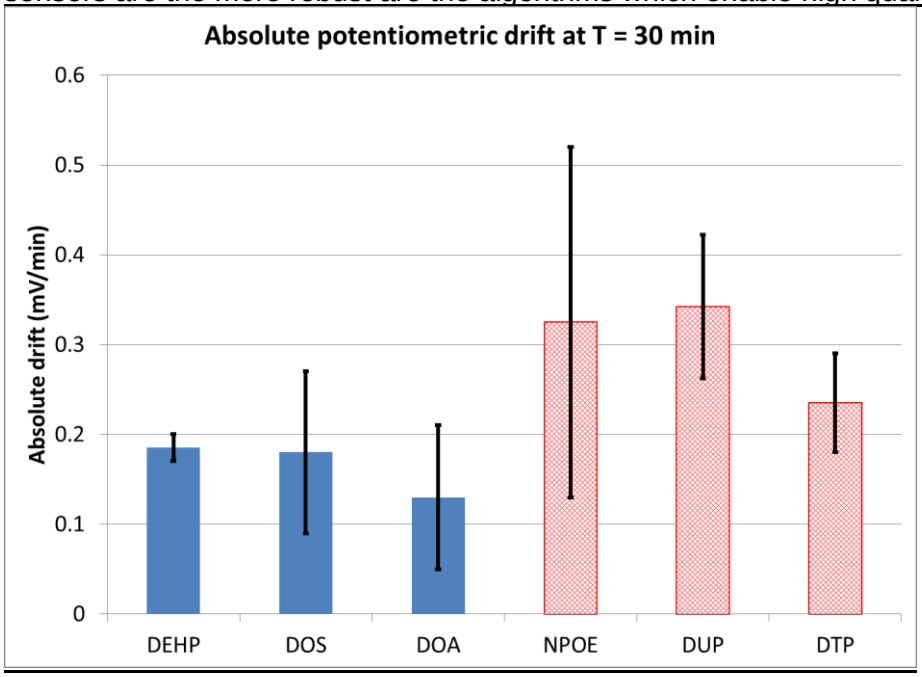
(A) Please provide information if actions have been taken to develop further possible alternatives for the application or alternatives for RoHS substances in the application.

Plasticizers can influence the selectivity and the rate at which sensors reach stable potentials when first exposed to aqueous reagents. These are key aspects of the sensor that allow for

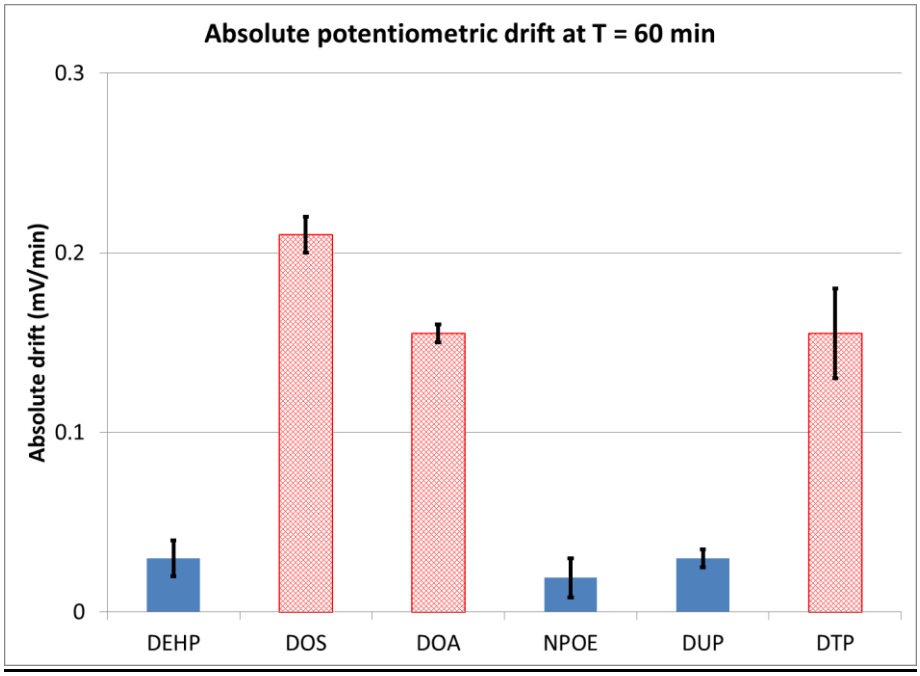
fast, reproducible, precise measurements and to achieve the short turn-around time required for critical settings. If the plasticizer induces high rates of drift and instability upon first use then reproducible and accurate results cannot be obtained. Poor results can cause misdiagnosis and lead to inappropriate treatment and patient harm. The alternative is to wait longer times until the sensors are stable which can negatively impact patient outcomes[7].

During the development of one manufacturer's systems. They tested a range of plasticizer classes (ether, diester, phthalate) to identify the one which would yield sensors with the best balance of early and later life stability in terms of potential (mV) drift per unit time. The pH sensor was used as the model and the following plasticizers were tested: Nitrophenyl octylether (NPOE), Dioctyl sebacate (DOS), Dioctyl adipate (DOA), DEHP , Diundecyl phthalate (DUP), Ditridecyl phthalate (DTP).

The results presented below show the absolute average and range bars of the measured change in millivolts (mV) over the tested time period in minutes (mV/min) with measurements from several sensors (as results vary).The objective was to find a plasticiser that will yield a sensor with the smallest amount of mV change over time when exposed to samples and calibration solutions. The less mV change, the more stable the sensor enabling the reporting of clinically accurate results. In addition the less initial change upon cartridge installation, the sooner a sample can be run on the analyser and results reported to the physician. A second characteristic is the reproducibility of the drift across many sensors. The more reproducible the sensors are the more robust are the algorithms which enable high quality clinical results.



[7] Point of Care 2012,11,pg 72



The above plots show the initial drift (mV/min) at T = 30 minutes and drift at T = 60 minutes after exposure to aqueous solutions for each of the tested plasticizers. At T = 30 minutes NPOE, DUP and DTP exhibit unacceptable drift and cannot be used to give reproducible and accurate results. DEHP exhibits one of lowest drift rates and the most reproducible results relative to all other plasticisers. At T = 60 min DOS, DOA and DTP all exhibit 5 – 7 times faster drift rate than DEHP. Taken together, DEHP exhibits the best balance of initial drift after one hour and reproducibility and is therefore the preferred plasticiser. This has allowed the technology to meet the needs of the critical care environment in particular a short period of time to obtain results and a short time before first measurement with a new cartridge.

(B) Please elaborate what stages are necessary for establishment of possible substitute and respective timeframe needed for completion of such stages.

One option is to replace DEHP in the current design would require the following stages to be carried out:

- Reformulate membranes (these are used with multiple types of sensors by each manufacturer,
- develop new algorithms used by the analyser to use alternative new modules. This would result in a new analyser that can be used only with the new modules (but current analysers can still only use the current designs of cartridges)
- develop new manufacture processes for modules,
- establish new quality control values for production,
- establish new external proficiency sample bench marks for testing,

- verify and validate performance (over use life and shelf life) with all types of analytes and for the required anions and cations. This includes testing with all conceivable combinations of ions and with other substances in body fluids that might affect performance,
- develop, validate and release new software,
- repeat all shipping studies,
- carry out clinical trials
- Apply for approval by a Notified Body for the modified analyser and modules

Assuming that this work is not limited by the availability of suitable engineers and no steps need to be repeated due to unsuitable results, which cannot be certain at this stage, the technical development work is likely to take, a minimum of 5 years. This work cannot be accelerated with more engineers as having additional engineers will not significantly reduce timescales as many of the activities must be carried out sequentially by individuals. Based on these constraints and taking into account that RoHS substitution is always found by manufacturers to take longer than they expect, a time period of 7 – 8 years is more realistic.

Once this technical work is completed, the manufacturer would then be required to gain re-approval under the IVD medical devices directive (CE mark) and also gain approval in all other countries where they are sold (as only one design will be made), including the USA, Japan and China (which has an exceptionally lengthy re-approval process). The regulatory path is of the order of 2 years, so the total period could be up to 10 years.

Modified ISE modules will however not be compatible with existing analysers that were designed with DEHP ISE modules and so an exemption would still be needed for these.

Faster substitution may however be achieved by the development of an alternative analysis technique commonly referred to as "lab-on-a-chip“ and this is the main focus of IVD equipment manufacturers. This technige is likely to use ion selective electrodes but these, the chemical pumps and analysis electronics are miniaturised so that only very small samples are required and analysis can be fairly rapid. This is however a very different design and so will take several more years to develop prototypes that can be thoroughly tested to determine if accurate analysis of all types of body fluid can be analysed accurately. When this is successful, then clinical trials followed by Notified Body approval can follow. The likely timescale is expected to be:

Table 1. Expected timescale for the development of alternative designs of analyser

Development phase	**Elapsed time**
Design of new miniaturised analysers and construction of prototypes	2 years from mid 2018
Testing to determine accuracy, adjustments to calibration. Establish manufacturing capabiltiy, site location and validation.	3 years
Clinical trials	1 year
Notified Body approval	6 months in EU, up to 2 years globally
Total elapsed time	**8 years (so by 2026)**
Support installed base of IVD analysers in EU hospitals	Current design of cartriges will be needed until **2030**

Note however that hospitals and clinics in the EU that already own IVD analysers that use cartridges that include sensors with DEHP membranes will continue to need to obtain these consumables until all of these analysers reach end of life as alternative designs will not be compatible. We estimate that cartridge consumables will be needed in the EU at least until 2030 and so this exemption will be needed for these until this date.

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8. Justification according to Article 5(1)(a):

(A) Links to REACH: (substance + substitute)

1) Do any of the following provisions apply to the application described under (A) and (C)?

☐ Authorisation

☒ SVHC
☒ Candidate list
☐ Proposal inclusion Annex XIV
☒ Annex XIV – note that ion selective electrode membranes containing DEHP are manufactured outside of the EU and so only articles are imported into the EU and DEHP is not used as a chemical substance in the EU.

☒ Restriction

☒ Annex XVII – only in toys and children's products so not applicable to this application. A proposed restriction on DEHP is materials which

have prolonged skin contact. However, hospital staff and patients cannot touch the membranes as they are inaccessible inside the cartridge.

☐ Registry of intentions

☒ Registration – Yes, see https://echa.europa.eu/registration-dossier/-/registered-dossier/15358

2) Provide REACH-relevant information received through the supply chain.
Name of document: _____

(B) Elimination/substitution:

1. Can the substance named under 4.(A)1 be eliminated?
   ☒ Yes. Consequences? A substitution plan is in place but is expected to take at least 8 years.
   ☐ No. Justification: _____
2. Can the substance named under 4.(A)1 be substituted?
   ☒ Yes.
   ☒ Design changes: A substitution plan is in place but is expected to take at least 8 years.
   ☐ Other materials:
   ☐ Other substance:
   ☐ No.
   Justification: _____
3. Give details on the reliability of substitutes (technical data + information): Not applicable as an alternative design is still under development
4. Describe environmental assessment of substance from 4.(A)1 and possible substitutes with regard to Not applicable to this exemption
   1) Environmental impacts: _____
   2) Health impacts: _____
   3) Consumer safety impacts: _____

⇨ Do impacts of substitution outweigh benefits thereof?
Please provide third-party verified assessment on this: _____

(C) Availability of substitutes:

a) Describe supply sources for substitutes: None known at present
b) Have you encountered problems with the availability? Describe: Not applicable
c) Do you consider the price of the substitute to be a problem for the availability?
   ☐ Yes ☒ No
d) What conditions need to be fulfilled to ensure the availability? Development of suitable substitute design, test results must be acceptable and authorisation globally is required

(D) Socio-economic impact of substitution:

⇨ What kind of economic effects do you consider related to substitution?

☐ Increase in direct production costs – lab-on-a-chip technology is not expected to incur higher production costs

☒ Increase in fixed costs – new production equipment will be needed to build substitute analysers

☐ Increase in overhead – none expected

☒ Possible social impacts within the EU – Negative qualitative socio-economic

Human health impacts: Without this exemption, EU hospital point of care units that use DEHP-ISE analysers will not be able to obtain DEHP-ISE module consumables and so will not be able to analyse patients' body fluids. There will be serious implications if delays in obtaining analysis results occur or if they are not accurate. Any delay in treatment could, as a worst case, result in unnecessary deaths (although it is impossible to estimate a quantitative impact).

Environmental impacts: Without this exemption, hospitals would be forced to dispose of IVD analysers prematurely resulting in electrical equipment being disposed of before its normally expected end of life giving an increase in electrical waste. Manufacture of substitute equipment (if and when suitable designs are available) to replace these will also have environmental and health impacts.

Economic impacts: Hospitals and clinics in the EU would also need to buy alternative analysers if cartridges are no longer available in the EU, although these analysers may not be available for some years as described above. This expenditure on replacement equipment would be instead of other new equipment that is needed and this could also negatively affect human health.

☐ Possible social impacts external to the EU – limited as DEHP-ISE modules can continue to be supplied to non-EU hospitals without this exemption, although a loss of jobs could result if cartridges cannot be sold in the EU.

☐ Other: _____

⇨ Provide sufficient evidence (third-party verified) to support your statement:

The socio-economic impacts described above will have implications in the EU but cannot be quantified. This exemption is justified on the basis that substitution is not technically practical and does not rely on socio-economic issues to justify the maximum validity period and so third party validation is not applicable in this case.

9. Other relevant information

Please provide additional relevant information to further establish the necessity of your request:

10. Information that should be regarded as proprietary

Please state clearly whether any of the above information should be regarded to as proprietary information. If so, please provide verifiable justification:

The calculation method for the quantity of DEHP used for this application in the EU annually is confidential and is provided separately.