Department for Environment Food & Rural Affairs

Authorisation Decision

by Marc Casale

Deputy Director, Chemicals and International (DEFRA)

On behalf of the Secretary of State for Environment, Food and Rural Affairs

Decision date: 27 March 2026

Application Ref: AFA064-01

Authorised use

Formulation of primer products with strontium chromate and/or potassium hydroxyoctaoxodizincatedichromate for use in the aerospace and defence industry and its supply chains.

UK REACH authorisation number:

Authorisation Number	Authorisation Holder
UKREACH/26/07/00 (strontium chromate)	Indestructible Paint Limited
UKREACH/26/07/01 (strontium chromate) UKREACH/26/07/02 (potassium hydroxyoctaoxodizincatedichromate)	PPG Industries (UK) Limited

Preliminary Matters

- The substances, strontium chromate (StC) and potassium hydroxyoctaoxodizincatedichromate (PHD), are listed in Annex XIV to assimilated Regulation (EC) 1907/2006 concerning the Registration,

Evaluation, Authorisation and Restriction of Chemicals (UK REACH).[1] As such, StC and PHD are subject to the authorisation requirement referred to in Article 56(1) of UK REACH.

- StC and PHD were included in Annex XIV due to their intrinsic carcinogenic properties (Article 57(a) of UK REACH).
- Hexavalent chromium (Cr(VI)) is the form of chromium in StC and PHD to which the hazardous properties are attributed.
- The review report is made by:
    a. Indestructible Paint Limited, with the company number 1376995, whose registered office is at 25 Pentos Drive, Sparkhill, Birmingham, B11 3TA
    b. PPG Industries (UK) Limited, with the company number 02110620, whose registered office is at PO Box 162, Needham Road, Stowmarket, Suffolk, United Kingdom, IP14 2AD.
- Indestructible Paint Limited and PPG Industries (UK) Limited (together, the 'Authorisation Holders'), who are members of the Aerospace and Defence Chromates Reauthorisation (ADCR) Consortium, were granted authorisations in accordance with Article 60(4) (the 'Existing Authorisations') under EU REACH for the use of StC and PHD on 16 April 2020 and 15 April 2020 respectively.[2]
- In accordance with Article 127F of UK REACH, on 31 December 2020, the Existing Authorisations had the relevant connection with Great Britain (GB) as the Authorisation Holders are established in GB. Therefore, the Existing Authorisations continued to have effect in GB under UK REACH from 1 January 2021, with authorisation numbers 26/UKREACH/20/6/0, 29UKREACH/20/7/7 and 28UKREACH/20/7/3. The expiry date of each of the Existing Authorisations was 22 January 2026.
- On 17 July 2024, the Authorisation Holders submitted a review report in relation to the Existing Authorisations (the 'Review Report') to the Health and Safety Executive (the 'Agency') with respect to the following continued use: formulation of primer products with StC and PHD for use in the aerospace and defence industry and its supply chains.
- The use takes place across two sites in GB.

[1] References to Regulation (EC) No 1907/2006, referred to in this decision as UK REACH, are to the assimilated law available online at: https://www.legislation.gov.uk/eur/2006/1907/contents
[2] EU REACH refers to Regulation (EC) No 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH).

- On 17 September 2025, the Agency sent its opinion (the 'Opinion') to the Secretary of State for Environment, Food and Rural Affairs, and the Scottish and Welsh Ministers.

Decision

1. This decision is addressed to the Authorisation Holders.
2. In accordance with Article 61(1) of UK REACH, effective from 27 March 2026, the authorisation set out below shall apply instead of the Existing Authorisations.
3. For the avoidance of doubt, the Existing Authorisations will continue to apply to relevant activities which took place before 27 March 2026.
4. Authorisation is granted to the Authorisation Holders for the following use, under the following Authorisation numbers:
    a. **UKREACH/26/07/00** for the formulation of primer products with StC for use in the aerospace and defence industry and its supply chains.
    b. **UKREACH/26/07/01** for the formulation of primer products with StC for use in the aerospace and defence industry and its supply chains.
    c. **UKREACH/26/07/02** for the formulation of primer products with PHD for use in the aerospace and defence industry and its supply chains.
5. Pursuant to Article 60(8) of UK REACH, the review period referred to in Article 60(9)(e) of UK REACH is set at 12 years. The authorisation will cease to be valid on 22 January 2038 unless a review report is submitted in accordance with Article 61(1) of UK REACH by 22 July 2036.
6. The authorisation is subject to the following conditions, as well as the requirement in Article 60(10) of UK REACH to ensure exposure is reduced to as low a level as is technically and practically possible:
    a. The operational conditions (OCs) and risk management measures (RMMs) described in the Authorisation Holders' chemical safety report dated July 2024[3] must be adhered to, subject to the following conditions in paragraphs 6.b. to 6.d., which take precedence over the OCs and RMMs described in the chemical safety report where these are incompatible.

[3] This is a reference to the updated chemical safety report dated July 2024 submitted by the Authorisation Holders as part of the Review Report. This is an updated version of the chemical safety report submitted with the Existing Authorisations, as was required by Article 62(4)(d) of EU REACH. The OCs and RMMs are described in sections 9 (exposure assessment) and 10 (risk characterisation related to combined exposure).

b. By 27 November 2027, each of the GB sites using StC and/or PHD for formulation activities must install engineering control measures to reduce the personal Cr(VI) inhalation exposures of the process operators below 5 μg/m^3 (the 'Agency Benchmark'), for the duration of the weighing out activity, without taking into account any respiratory protective equipment (RPE) that may be worn. The engineering controls installed must be at least one of those set out in 6.b.i. and 6.b.ii., unless the authorisation holder can provide evidence to the Agency by 27 November 2027 that an alternative technical or organisational RMM achieves an equivalent or better outcome.

   i. The whole of the weighing out and dispensing activity (that is outlined in worker contributing scenario 2 of the Authorisation Holders' chemical safety report dated July 2024) must be take place inside a suitably sized laminar downflow booth, with a fixed vertical screen between the weigh-scale and the operator that is weighing out the Cr(VI) products (such as those used in the pharmaceutical and detergent industries for the safe handling of hazardous dusts); and/or

   ii. A vacuum transfer system must be installed for transferring the weighed quantity of solid chromate directly into the mixer as a closed vessel addition. The vacuum transfer unit should be bolted onto the lid of the mixer enclosure via a new aperture such there is an air-tight and dust-tight seal formed between the vacuum transfer unit and the inside of the mixer. The vacuum transfer unit must incorporate an H14 high efficiency particulate air (HEPA) filter on the air vent from the unit. The vacuum lance should be used to suck out the solid chromate powder/flake directly from its container and then discharge it straight into the mixer vessel.

c. To demonstrate the effectiveness of the engineering control measure(s) required by paragraph 6.b., personal air monitoring to BS ISO 16740:2005[4] must be undertaken on the process-operator on at least 3 separate days to show that exposures to Cr(VI) (as a result of the use of StC and/or PHD) are below the Agency Benchmark.

d. By 27 February 2028, each authorisation holder must submit a written update (the 'Update Report') to the Agency. Each Update Report must provide details of the revised RMMs for the authorisation holder concerned, including:

[4] BS ISO 16740:2005 specifies a method for the determination of the TWA mass concentration of hexavalent chromium in workplace air. This international standard is applicable to the personal sampling of the inhalable fraction of airborne particles, as defined in ISO 7708, and to static (area) sampling. The analytical method is applicable to the determination of masses of 0.01 μg to 10 μg of hexavalent chromium per sample, without dilution.

i. photographs and commissioning data, including performance test results, of any engineering control measures that have been installed in accordance with paragraph 6.b.; and

ii. personal air monitoring data undertaken in accordance with paragraph 6.c.

7. The authorisation is subject to the following monitoring arrangements to monitor exposure of StC and/or PHD to workers:

   a. At least 10 GB personal inhalation exposure measurements must be taken for each similar exposed group (SEG) every 12 months within the duration of the review period, covering all the relevant worker contributing scenarios within the exposure scenarios where StC and/or PHD are used. The monitoring must cover operators handling solid chromates (outlined in worker contributing scenario 1 of the Authorisation Holders' chemical safety report dated July 2024) for all related sub tasks. Workplace air sampling surveys must be undertaken by a suitable competent person[5] every 12 months.

   b. In every case, the exposure measurements referred to in paragraph 7.a. must be:

      i. based on the methodology specified in BS ISO 16740:2005.

      ii. taken within the 30 centimetre breathing zone of the wearer with samplers positioned on the outside of any RPE that may be worn.

      iii. representative of the range of tasks with possible exposure to Cr(VI), and of the total number of workers that are potentially exposed.

      iv. supported by adequate contextual (and observational) information for each sampling event sufficient to interpret and inform the results (as detailed within BS EN689:2018).

   c. The information in paragraph 7.a. must be used to regularly review the effectiveness of the OCs and RMMs. If personal exposures are above the Agency Benchmark, prompt action must be taken, as appropriate, to reduce workers' exposure to Cr(VI) to below the Agency Benchmark.

   d. In instances where the RMMs have been modified to reduce exposures, as referenced in paragraph 7.c., the authorisation holders must undertake personal monitoring surveys at least every 3 months using the methodology that is given in BS ISO 16740:2005 until a minimum of 10

[5] For example, an occupational hygienist - A new Register of Occupational Hygiene Professionals was launched in 2024 – see Register of Occupational Hygiene Professionals - British Occupational Hygiene Society (BOHS) for further details. Frequently asked questions (FAQs) about the Register can be found at Professional-Register-of-Occupational-Hygiene-Professionals-FAQs-for-GP.pdf. A Directory of Occupational Hygiene Services can be found at Directory of OH Services (bohs.org).

personal exposure data points have been obtained, from which the new 90th percentile of the worker's personal exposure to Cr(VI) after the change in the RMMs shall be determined. If personal exposures are still above the Agency Benchmark, further prompt action should be taken, as appropriate, to reduce workers' exposure to Cr(VI) to below the Agency Benchmark.

e. The results of the measurements referred to in paragraphs 7.a. to 7.d., including all relevant detailed contextual information, should be made available to the Agency if requested.

8. The Agency has set out recommendations for the authorisation holders in section 10 of its Opinion, should the authorisation holders submit a review report in accordance with Article 61(1) of UK REACH. These recommendations are not conditions of authorisation or conditions for any review report.

Background

9. In accordance with Article 61(1) of UK REACH, the Authorisation Holders submitted a Review Report containing updated versions of the following documents initially submitted with respect to the Existing Authorisations:

   a. the analysis of alternatives.

   b. the socio-economic analysis.

   c. the chemical safety report.

   d. the applicable uses of StC and PHD.

10. This decision is made pursuant to Article 61 of UK REACH and having obtained the consent of Scottish and Welsh Ministers.

11. In making this decision I have taken into account:

   a. the Existing Authorisations (including associated documentation).

   b. the Review Report submitted to the Agency.

   c. the provisions of Article 60 and Article 61 of UK REACH, including the elements referred to in Article 60(4) and the requirements of Article 60(5) (as applicable).

   d. the Opinion.

   e. any change of circumstances detailed in the Review Report, which if known at the time of granting the Existing Authorisations, would have affected the decision to grant the Existing Authorisations or the terms of the Existing Authorisations.

Reasons

12. In its Opinion, the Agency concluded that it is not possible to determine a derived no-effect level for the carcinogenic and mutagenic properties of StC and PHD. Therefore, it is not possible to determine a threshold in accordance with section 6.4 of Annex I of UK REACH.

13. Therefore, and in accordance with Article 60(3)(a) of UK REACH, Article 60(2) of UK REACH does not apply and authorisation may only be granted on the basis of Article 60(4) of UK REACH.

14. The Authorisation Holders have submitted the Review Report in accordance with Article 61(1) of UK REACH. Authorisation may only be granted under Article 60(4) of UK REACH if it is shown that the socio-economic benefits outweigh the risk to human health or the environment arising from the use of StC and PHD and if there are no suitable alternative substances or technologies.

Risk to human health

15. StC and PHD present a risk to human health due to their carcinogenic properties.

Workers

16. The potential human health risk to directly exposed workers is the risk of developing lung cancer as a result of the inhalation of Cr(VI) in the course of work activities.[6]

17. To assess worker exposure to StC and PHD, the Authorisation Holders collected personal air monitoring samples. One Authorisation Holder provided 53 monitoring samples, and the other Authorisation Holder provided 24 monitoring samples, including samples collected from European Economic Area (EEA) sites. Based on the data provided in the Review Report, the Agency concluded that the Authorisation Holders have demonstrated that the 90th percentile of personal exposures for each worker contributing scenario are less than the Agency Benchmark when RMMs and frequency adjustments are considered. I agree with the Agency's conclusion.

18. One Authorisation Holder provided no biological monitoring data. In its Opinion, the Agency concluded that, while certainty regarding emissions of Cr(VI) could be improved by increasing the number of monitoring samples, the

[6] Dermal and ingestion are other routes of exposure. However, exposure via ingestion is factored into the risk of inhalation exposure and exposure via the dermal route was not measured or modelled in the application as there is no indication that dermal exposure to Cr(VI) compounds presents a cancer risk to humans.

information provided by the Authorisation Holder is considered adequate and appropriate. I agree with the Agency's conclusion.

19. The other Authorisation Holder provided 320 biological monitoring data samples. Two of the 320 results exceeded the biological monitoring guidance value (BMGV) of 10 µmol Cr/mol creatinine in urine.[7] They stated in the Review Report that the individuals with elevated results were rested and retested, yielding results below the BMGV. In its Opinion, the Agency concluded that the biological monitoring results may be indicative of the dangers of a high reliance on personal protective equipment (PPE). The Agency noted that exposure should be controlled to comply with the requirements of UK REACH by technical and engineering controls rather than PPE, which only protects the wearer. I agree with the Agency's conclusion on the biological monitoring data.

20. In its Opinion, the Agency noted that one Authorisation Holder provided limited personal exposure data which is supplemented by EEA data within the chemical safety report. The Agency concluded that the supplemented EEA data is sufficient to form an exposure estimate (due to the GB and EEA data being broadly consistent). Nevertheless, the Agency concluded that any future data collected should be sufficient to evaluate the Authorisation Holders individually. Therefore, the conditions and monitoring arrangements (see paragraphs 6 and 7 above) informed by the Agency's recommendations, will ensure that any future data will be fully representative as a measure of effectiveness of exposure controls for the Authorisation Holders. Additionally, in its Opinion, the Agency noted that the proposed monitoring arrangements will inform the Authorisation Holders on whether there is a need to review their exposure controls and improve them. I agree with this conclusion and the proposed conditions and monitoring arrangements.

21. In its Opinion, the Agency noted that the OCs and RMMs described in the Review Report dated July 2024 could be appropriate and effective in limiting the risk to workers if they are adhered to. However, the Agency concluded that there were concerns as to whether the OCs and RMMs are the most appropriate measures that could be implemented with respect to the principles of hierarchy of exposure control. This is due to a high reliance upon PPE for some tasks and the effectiveness of the local exhaust ventilation at the site operated by one Authorisation Holder.[8] Therefore, the Agency concluded that the Authorisation Holders' OCs and RMMs are not appropriate and effective,

[7] In its Opinion, the Agency noted that the biological monitoring is for total chromium (Cr) and not Cr(VI). As such, it measures exposure to all forms of Cr and must be interpreted with caution.
[8] In its Opinion, the Agency noted that in isolation, these RMMs could be considered effective for reducing exposures. However, overall, these measures are considered to fall short of the full application of the best practices of implementing the hierarchy of exposure control where they are reliant on PPE. This reliance is not appropriate for a non-threshold carcinogen.

and that the proposed additional monitoring activities should better inform the conclusions on the RMMs.

22. The Agency assessed the monetised human health impacts to workers to be between £1,000 and £2,000 over the 12-year review period using the willingness to pay methodology.[9] This accounts for 20 directly exposed workers across 2 sites in GB.

23. Having evaluated the Agency's assessment, I agree with its conclusion that the OCs and RMMs described in the Review Report are not appropriate and effective in limiting the risk to workers. To address the issues, in its Opinion, the Agency recommended conditions and monitoring arrangements for workers to facilitate the ongoing assessment of the performance of the OCs and RMMs. I agree with this conclusion and the recommended conditions and monitoring arrangements (see paragraphs 6 and 7 above).

Humans via the environment

24. According to the Authorisation Holders, StC and PHD (and thus their hazardous component, (Cr(VI)) could be released to the environment through emissions to air, water, soil and waste. In its Opinion, the Agency concluded that the Authorisation Holders' OCs and RMMs are likely to prevent direct releases of Cr(VI) to water and soils at the sites, and that releases from waste are expected to be minimal. For air, the Agency concluded in its Opinion that releases of Cr(VI) to the atmosphere are expected to be low, as StC and PHD have a very low vapour pressure. Overall, in its Opinion, the Agency concluded that the OCs and RMMs described in the Review Report are appropriate and effective in limiting the risk to humans via the environment.

25. The Authorisation Holders provided monitoring data for both sites that indicated that the measured concentrations of Cr(VI) are below the best available techniques (BAT) benchmark value of 1 mg/m^3.[10] In its Opinion, the Agency concluded that while certainty regarding emissions of Cr(VI) to the atmosphere could be improved by increasing the number of monitoring samples, the emission figures provided by the Authorisation Holders are considered adequate and appropriate. I agree with the Agency's conclusion.

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[9] The number of statistical cancer cases for workers is estimated by applying the 90th percentile inhalation exposure values for each worker contributing scenario to the number of exposed workers. This risk figure is then adjusted for the length of the review period, and a ratio of fatal to non-fatal cancer cases is applied (79:21). A 10-year latency period is applied to lung cancer cases, conservatively assuming constant exposure. To monetise these cases, a value for cancer morbidity (based on an ECHA study (2016) which adopts willingness-to-pay methodology) is applied; the value per statistical fatal cancer case is £3.9m-£5.4m and the value per statistical non-fatal cancer case is £0.4m- £0.5m. Discount rates of 1.5-3.5% are applied.

[10] The BAT standards for emissions to wastewater are 0.1 mg/L for Cr(VI) and 1.0 mg/L for total chromium. It is not possible to determine the concentration of Cr(VI) using the concentration of total chromium.

26. The Agency assessed the monetised health impacts to humans via the environment to be between £1,000 and £2,000 over the 12-year review period[11]. This accounts for an estimated general population of 33,000 across 2 sites in GB.

27. Having evaluated the Agency's assessment, I agree with the Agency's conclusions that the OCs and RMMs described in the Review Report are appropriate and effective in limiting the risk to humans via the environment.

Socio-economic analysis

28. In its Opinion, the Agency assessed the socio-economic benefits arising from the applied for use and the socio-economic implications of a refusal to authorise. The socio-economic benefits of authorisation consist of avoided producer surplus loss and avoided social cost of unemployment, and the Agency estimated this to be at least £3.2 million over 12 years.

29. Having evaluated the Agency's assessment, I agree with its conclusions on the quantitative and qualitative benefits.

Conclusion on whether the benefits outweigh the risk

30. In its Opinion, the Agency concluded that the Authorisation Holders have demonstrated that the monetised socio-economic benefits of granting authorisation (at least £3.2 million over 12 years) are greater than the monetised risks to human health (up to £3,000 over 12 years). This constitutes a benefit to cost ratio of over 1000:1.

31. I consider that the Authorisation Holders have shown that the socio-economic benefits outweigh the risk because of:

    a. The likely quantitative benefits in respect of the avoided producer surplus loss and avoided social cost of unemployment (including employees carrying out the use applied-for only) to the Authorisation Holders.

    b. The assessed risks from the use of StC and PHD.

Alternatives

32. At the formulation stage, StC and PHD have no specific function, and hence no analysis of alternatives was provided by the Authorisation Holders. In their

[11] To estimate the number of cases for humans via the environment, the Agency use 90th percentile humans via the environment exposure estimates and applied them to the population within 1km of the site (found using an online population estimation tool). The intestinal and lung cancer cases are separated due to different exposure-response relationships. A ratio of fatal to non-fatal cancer cases is applied for both lung cancer (79:21) and intestinal cancer (45:55). A 10-year latency period is assumed. To monetise these cases, a value for cancer morbidity (based on an ECHA study (2016) which adopts willingness-to-pay methodology) is applied; the value per statistical fatal cancer case is £3.9m-£5.4m and the value per statistical non-fatal cancer case is £0.4m- £0.5m. Discount rates of 1.5-3.5% are applied based.

Review Report the Authorisation Holders noted that the formulations are used across a range of surface treatment processes in the aerospace and defence industry which are subject to other applications for authorisation, and in which substitution activities are addressed. When substitution has occurred in these uses, there will then be no requirement for the formulations.

33. The Agency agreed with this approach, caveating that the analysis of alternatives is not relevant as StC and PHD do not provide any specific function at the formulation stage, and an analysis of alternatives has been provided in other UK REACH applications for authorisation of subsequent uses of the formulations. Therefore, the Agency did not undertake an assessment of the analysis of alternatives for this use.

34. Having evaluated the Agency's assessment, I agree with the conclusion that an analysis of alternatives is not relevant to this particular use, for the reasons stated above. I agree with the Agency's approach of not undertaking an assessment of the analysis of alternatives for this use.

Review period

35. In its Opinion, the Agency recommended the review period referred to in Article 60(8) of UK REACH should be set at 12 years.

36. In their Review Report, the Authorisation Holders requested a 12-year review period. The Agency believes that this review period is realistic when considering that:

    a) The formulation use is entirely dependent on subsequent use demand in the aerospace and defence industry. As such, the use will only continue if there is continued use of the formulations.

    b) In its Opinion, the Agency concluded that the applications for subsequent treatment uses have justified the associated requested review periods of 12 years.

    c) In its Opinion, the Agency concluded that there are no substantial exposure concerns that should affect the 12-year review period, provided that the Authorisation Holders implement the conditions and monitoring arrangements.

37. Having evaluated the Agency's assessment, I agree with the Agency's conclusions on these points and its recommendation for a 12-year review period.

Conclusion

38. For the reasons set out above, I conclude that the socio-economic benefits outweigh the risk to human health for the use of StC and PHD referred to in

paragraph 4 and that an analysis of alternatives is not relevant to this particular use.

39. The Scottish Ministers and the Welsh Ministers have given their consent to this decision in accordance with the requirements of UK REACH.

40. In accordance with the provisions of Article 61(1), the Existing Authorisations are amended and replaced with this decision, effective from 27 March 2026.

M Casale

Marc Casale

Deputy Director, Chemicals and International

On behalf of the Secretary of State for Environment, Food and Rural Affairs