

**C.I. Pigment Black 26 (CAS# 68186-94-7) GreenScreen® for Safer Chemicals (GreenScreen®)
Assessment**

Prepared for:

Washington State Department of Ecology

Prepared by:

ToxServices LLC

October 17, 2014



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GreenScreen® Executive Summary for C.I. Pigment Black 26 (CAS #68186-94-7)

C.I. Pigment Black 26 is a chemical that functions as a pigment.

C.I. Pigment Black 26 was assigned a GreenScreen® Benchmark Score of 1 (“Avoid – Chemical of Concern”) as it has High Group II Human Toxicity (repeated exposure systemic toxicity (STr*)) and Very High persistence (P). This corresponds to GreenScreen® benchmark classification 1c (vPT) in CPA 2011. Data gaps (DG) exist for reproductive toxicity (R), developmental toxicity (D), endocrine activity (E), repeated exposure neurotoxicity (Nr*), skin sensitization (SnS*), respiratory sensitization (SnR*), and chronic aquatic toxicity (CA). As outlined in CPA (2013) Section 12.2 (Step 8 – Conduct a Data Gap Analysis to assign a final Benchmark score), C.I. Pigment Black 26 meets requirements for a GreenScreen® Benchmark Score of 1 despite the hazard data gaps. In a worst-case scenario, if C.I. Pigment Black 26 were assigned a High score for the data gaps reproductive toxicity (R), developmental toxicity (D), endocrine activity (E), repeated exposure neurotoxicity (Nr*), skin sensitization (SnS*), respiratory sensitization (SnR*), or chronic aquatic toxicity (CA), it would still be categorized as a Benchmark 1 Chemical.

GreenScreen® Benchmark Score for Relevant Route of Exposure:

As a standard approach for GreenScreen® evaluations, all exposure routes (oral, dermal, and inhalation) were evaluated together, so the GreenScreen® Benchmark Score of 1 (“Avoid – Chemical of Concern”) is applicable for all routes of exposure.

GreenScreen® Hazard Ratings for C.I. Pigment Black 26

Group I Human					Group II and II* Human								Ecotox		Fate		Physical		
C	M	R	D	E	AT	ST		N		SnS*	SnR*	IrS	IrE	AA	CA	P	B	Rx	F
						single	repeated*	single	repeated*										
<i>L</i>	<i>L</i>	DG	DG	DG	L	L	H	L	DG	DG	DG	L	L	L	DG	vH	L	L	L

Note: Hazard levels (Very High (vH), High (H), Moderate (M), Low (L), Very Low (vL)) in *italics* reflect estimated values, authoritative B lists, screening lists, weak analogues, and lower confidence. Hazard levels in **BOLD** font are used with good quality data, authoritative A lists, or strong analogues. Group II Human Health endpoints differ from Group II* Human Health endpoints in that they have four hazard scores (i.e., vH, H, M, and L) instead of three (i.e., H, M, and L), and are based on single exposures instead of repeated exposures. Please see Appendix A for a glossary of hazard acronyms.

GreenScreen® Assessment for C.I. Pigment Black 26 (CAS #68186-94-7)

Method Version: GreenScreen® Version 1.2¹
Assessment Type²: Certified

Chemical Name: C.I. Pigment Black 26

CAS Number: 68186-94-7

GreenScreen® Assessment Prepared By:

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Organization: ToxServices LLC

Date: October 3, 2014

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Title: Managing Director and Chief Toxicologist

Organization: ToxServices LLC

Date: October 17, 2014

Confirm application of the *de minimus* rule³: N/A

Chemical Structure(s):

C.I. Pigment 26 is an inorganic pigment which is a crystalline matrix of spinel containing homogeneously and ionically interdiffused manganese (II) oxide, manganese (III) oxide, iron (II) oxide, and iron (III) oxide. It may also contain one or a combination of the modifiers Al₂O₃, CoO, CuO, NiO or SiO₂ (ChemIDplus 2014).

Also called: C.I. 77494; Manganese ferrite black spinel (ChemIDplus 2014)

Chemical Structure(s) of Chemical Surrogates Used in the GreenScreen®:

Due to insufficient data available for C.I. Pigment Black 26, ferrosferric oxide (CAS #1317-61-9) is used as a read-across chemical in the REACH dossier for C.I. Pigment Black 26. Ferrosferric oxide is a Fe₃O₄ that contains iron II and III. It is a black ore of iron with crystalline structures. ToxServices noted that ferrosferric oxide does not contain manganese or other possible metal components of C.I. Pigment Black 26. Therefore, ToxServices considered ferrosferric oxide as a weak surrogate.

Identify Applications/Functional Uses:

Pigment (ChemIDPlus 2014)

GreenScreen® Summary Rating for C.I. Pigment Black 26⁴: C.I. Pigment Black 26 was assigned a GreenScreen® Benchmark Score of 1 (“Avoid – Chemical of Concern”) as it has High Group II Human Toxicity (repeated exposure systemic toxicity (STr*)) and Very High persistence (P). This corresponds

¹ Use GreenScreen® Assessment Procedure (Guidance) V1.2

² GreenScreen® reports are either “UNACCREDITED” (by unaccredited person), “AUTHORIZED” (by Authorized GreenScreen® Practitioner), “CERTIFIED” (by Licensed GreenScreen® Profiler or equivalent) or “CERTIFIED WITH VERIFICATION” (Certified or Authorized assessment that has passed GreenScreen® Verification Program)

³ Every chemical in a material or formulation should be assessed if it is:

1. intentionally added and/or
2. present at greater than or equal to 100 ppm

⁴ For inorganic chemicals with low human and ecotoxicity across all hazard endpoints and low bioaccumulation potential, persistence alone will not be deemed problematic. Inorganic chemicals that are only persistent will be evaluated under the criteria for Benchmark 4.

to GreenScreen® benchmark classification 1c (vPT) in CPA 2011. Data gaps (DG) exist for reproductive toxicity (R), developmental toxicity (D), endocrine activity (E), repeated exposure neurotoxicity (Nr*), skin sensitization (SnS*), respiratory sensitization (SnR*), and chronic aquatic toxicity (CA). As outlined in CPA (2013) Section 12.2 (Step 8 – Conduct a Data Gap Analysis to assign a final Benchmark score), C.I. Pigment Black 26 meets requirements for a GreenScreen® Benchmark Score of 1 despite the hazard data gaps. In a worst-case scenario, if C.I. Pigment Black 26 were assigned a High score for the data gaps reproductive toxicity (R), developmental toxicity (D), endocrine activity (E), repeated exposure neurotoxicity (Nr*), skin sensitization (SnS*), respiratory sensitization (SnR*), or chronic aquatic toxicity (CA), it would still be categorized as a Benchmark 1 Chemical

Figure 1: GreenScreen® Hazard Ratings for C.I. Pigment Black 26

Group I Human					Group II and II* Human								Ecotox		Fate		Physical		
C	M	R	D	E	AT	ST		N		SnS*	SnR*	IrS	IrE	AA	CA	P	B	Rx	F
						single	repeated*	single	repeated*										
<i>L</i>	<i>L</i>	DG	DG	DG	L	L	H	L	DG	DG	DG	L	L	L	DG	vH	<i>L</i>	<i>L</i>	L

Note: Hazard levels (Very High (vH), High (H), Moderate (M), Low (L), Very Low (vL)) in *italics* reflect estimated (modeled) values, authoritative B lists, screening lists, weak analogues and lower confidence. Hazard levels in **BOLD** font are used with good quality data, authoritative A lists, or strong analogues. Group II Human Health endpoints differ from Group II* Human Health endpoints in that they have four hazard scores (i.e. vH, H, M, and L) instead of three (i.e. H, M, and L), and are based on single exposures instead of repeated exposures. Please see Appendix A for a glossary of hazard acronyms.

Transformation Products and Ratings:

Identify feasible and relevant fate and transformation products (i.e., dissociation products, transformation products, valence states) **and/or moieties of concern**⁵

No data were identified on the transformation products of C.I. Pigment Black 26. Its possible individual components are listed in the table below. Several of its components are LT-1 chemicals, including cobalt oxide, nickel oxide, and silicon dioxide, due to carcinogenicity. These components may not always be present in C.I. Pigment Black 26, and it is not clear if they can be released from the spinel crystalline structure. However, as a pigment, C.I. Pigment Black 26 is expected to be resistant to environmental transformation as an inherent property of colorants. Therefore, the Benchmark Score of the parent chemical is not modified.

⁵ A moiety is a discrete chemical entity that is a constituent part or component of a substance. A moiety of concern is often the parent substance itself for organic compounds. For inorganic compounds, the moiety of concern is typically a dissociated component of the substance or a transformation product.

Functional Use	Life Cycle Stage	Transformation Pathway	Transformation Products	CAS #	Feasible and Relevant?	GreenScreen® List Translator Score or Benchmark Score ^{6,7}
N/A	N/A	N/A	MnO	11129-60-5	N	LT-U
N/A	N/A	N/A	Mn ₂ O ₃	1317-34-6	N	LT-U
N/A	N/A	N/A	FeO	1345-25-1	N	LT-U
N/A	N/A	N/A	Fe ₂ O ₃	1309-37-1	N	BM 2
N/A	N/A	N/A	Al ₂ O ₃	1344-28-1	N	LT-U
N/A	N/A	N/A	CoO	1307-96-6	N	LT-1 (Prop 65 carcinogen, MAK group 2 carcinogen)
N/A	N/A	N/A	CuO	1317-38-0/1344-70-3	N	LT-P1 (German FEA Class 4 severe hazard to waters)
N/A	N/A	N/A	NiO	1313-99-1	N	LT-1 (EU CMR(1) category 1 carcinogen, R49, Prop 65 carcinogen, H350i, MAK group 1 carcinogen, EU CMR (2) category 1A carcinogen)
N/A	N/A	N/A	SiO ₂	7631-86-9	N	LT-1 (NIOSH-C occupational carcinogen)

⁶ The GreenScreen® List Translator identifies specific authoritative or screening lists that should be searched to screen for GreenScreen® benchmark 1 chemicals (CPA 2012b). Pharos (Pharos 2014) is an online list-searching tool that is used to screen chemicals against the lists in the List Translator electronically.

⁷ The way you conduct assessments for transformation products depends on the Benchmark Score of the parent chemical (See Guidance).

Introduction

C.I. Pigment Black 26 is an inorganic manganese ferrite black spinel that is used as a colorant. It is obtained by high temperature calcination (ChemIDplus 2014).

ToxServices assessed C.I. Pigment Black 26 against GreenScreen® Version 1.2 (CPA 2013) following procedures outlined in ToxServices' SOP 1.69 (GreenScreen® Hazard Assessment) (ToxServices 2013).

GreenScreen® List Translator Screening Results

The GreenScreen® List Translator identifies specific authoritative or screening lists that should be searched to identify GreenScreen® benchmark 1 chemicals (CPA 2012b). Pharos (Pharos 2014) is an online list-searching tool that is used to screen chemicals against the List Translator electronically. It checks all of the lists in the List Translator with the exception of the U.S. Department of Transportation (U.S. DOT) lists (U.S. DOT 2008a,b) and these should be checked separately in conjunction with running the Pharos query. The output indicates benchmark or possible benchmark scores for each human health and environmental endpoint. The output for C.I. Pigment Black 26 can be found in Appendix C and a summary of the results can be found below:

- Environment Canada: DSL substances that are persistent
- Not on DOT (2008a,b) lists

PhysicoChemical Properties of C.I. Pigment Black 26

C.I. Pigment Black 26 is an inorganic black powder with a crystalline structure. As such, it is not expected to be volatile, and log K_{ow} is not applicable in describing its properties. This mixture is not soluble in water.

Table 1: Physical and Chemical Properties of C.I. Pigment Black 26 (CAS #68186-94-7)

Property	Value	Reference
Molecular formula	Mixture	
SMILES Notation	N/A	
Molecular weight	N/A	
Physical state	Solid	ECHA 2014
Appearance	Black powder	ECHA 2014
Melting point	1,000°C	ECHA 2014
Vapor pressure	N/A	
Water solubility	1 µg/L at 20°C, pH 8	ECHA 2014
Dissociation constant	N/A	
Density/specific gravity	4.8 g/cm ³	ECHA 2014
Partition coefficient	N/A	
Particle size	Mass median diameter: 1.2 µm	ECHA 2014
Structure	Crystalline	ChemIDplus 2014
Bioavailability	N/A	

Hazard Classification Summary Section:

Group I Human Health Effects (Group I Human)

Carcinogenicity (C) Score (H, M, or L): L

C.I. Pigment Black 26 was assigned a score of Low for carcinogenicity based on an epidemiological study on the surrogate. GreenScreen® criteria classify chemicals as a Low hazard for carcinogenicity when adequate data are available and negative, there are no structural alerts, and they are not classifiable under GHS (CPA 2012a).

- Authoritative and Screening Lists
 - Not on any authoritative or screening lists
- ECHA 2014
 - *Ferrosferric oxide*: A retrospective cohort study was conducted among 17,701 workers employed in a French carbon steel production factory. Workers employed for at least one year between 1959 and 1997 were followed up for mortality and causes of death from January 1968 to December 1998. In addition, data on job histories and smoking habits were sought. Occupational exposures were evaluated by a factory-specific job-exposure matrix developed by a panel of 8 experts and validated with analytical measurements. There was no lung cancer excess for exposure to iron oxide, and there was no dose-response relationship regarding intensity, duration of exposure, and cumulative index. It was concluded that a relationship between exposure to iron oxides and lung cancer was not detected.

Mutagenicity/Genotoxicity (M) Score (H, M, or L): L

C.I. Pigment Black 26 was assigned a score of Low for mutagenicity/genotoxicity based on negative data for C.I. Pigment Black 26 and for the surrogate. GreenScreen® criteria classify chemicals as a Low hazard for mutagenicity/genotoxicity when adequate data are available and negative for both mutation and chromosomal aberration, there are no structural alerts, and they are not classifiable under GHS (CPA 2012a).

- Authoritative and Screening Lists
 - Not on any authoritative or screening lists
- ECHA 2014
 - C.I. Pigment Black 26 is negative for mutation in a GLP-compliant bacterial reverse mutation assay (OECD 471). No induction of mutation frequency was observed in *Salmonella typhimurium* tester strains TA98, TA100, TA102, TA1535, and TA1537 at concentrations of up to 5,000 µg/plate in the presence and absence of metabolic activation.
 - *Ferrosferric oxide*: Negative for mutagenicity in a GLP-compliant gene mutation assay (OECD 476) in Chinese hamster lung fibroblasts (V79) at up to 36 µg/mL with and without metabolic activation.
 - *Ferrosferric oxide*: Negative for clastogenicity in a GLP-compliant mammalian cell chromosomal aberration test (OECD 473) in V79 cells at up to 25 µg/mL with and without metabolic activation.

Reproductive Toxicity (R) Score (H, M, or L): DG

C.I. Pigment Black 26 was assigned a score of Data Gap for reproductive toxicity based on lack of data.

- Authoritative and Screening Lists
 - Not on any authoritative or screening lists
- No data were identified.

Developmental Toxicity incl. Developmental Neurotoxicity (D) Score (H, M, or L): DG

C.I. Pigment Black 26 was assigned a score of Data Gap for developmental toxicity based on lack of data identified.

- Authoritative and Screening Lists
 - Not on any authoritative or screening lists
- No data were identified.

Endocrine Activity (E) Score (H, M, or L): DG

C.I. Pigment Black 26 was assigned a score of Data Gap for endocrine disruption based on lack of data identified.

- Authoritative and Screening Lists
 - Not on any authoritative or screening lists
- Not listed as a potential endocrine disruptor on the EU Priority List of Suspected Endocrine Disruptors.
- Not listed as a potential endocrine disruptor on the OSPAR List of Chemicals of Possible Concern.
- No data were identified.

Group II and II* Human Health Effects (Group II and II* Human)

Note: Group II and Group II endpoints are distinguished in the v 1.2 Benchmark system. For Systemic Toxicity and Neurotoxicity, Group II and II* are considered sub-endpoints and test data for single or repeated exposures may be used. If data exist for single OR repeated exposures, then the endpoint is not considered a data gap. If data are available for both single and repeated exposures, then the more conservative value is used.*

Acute Mammalian Toxicity (AT) Group II Score (vH, H, M, or L): L

C.I. Pigment Black 26 was assigned a score of Low for acute toxicity based on measured data.

GreenScreen[®] criteria classify chemicals as a Low hazard for acute toxicity when oral LD₅₀ > 2,000 mg/kg (CPA 2012a).

- Authoritative and Screening Lists
 - Not on any authoritative or screening lists
- ECHA 2014
 - Oral LD₅₀ > 10,000 mg/kg in Wistar rats

Systemic Toxicity/Organ Effects incl. Immunotoxicity (ST)

Group II Score (single dose) (vH, H, M, or L): L

C.I. Pigment Black 26 was assigned a score of Low for systemic toxicity (single dose) based on lack of systemic effects at an oral dose of 10,000 mg/kg. GreenScreen[®] criteria classify chemicals as a Low hazard for systemic toxicity (single dose) when no systemic toxicity was identified after oral doses of > 2,000 mg/kg, and there is no respiratory irritation after inhalation (CPA 2012a).

- Authoritative and Screening Lists
 - Not on any authoritative or screening lists
- ECHA 2014
 - In the acute oral toxicity study that identified the LD₅₀ of > 10,000 mg/kg, a single oral dose of 10,000 mg/kg was gavaged to 10 male Wistar rats followed by a 14-day observation period. There were no mortality or symptoms identified.

Group II* Score (repeated dose) (H, M, or L): H

C.I. Pigment Black 26 was assigned a score of High for systemic toxicity (repeated dose) based on pulmonary effects consistent with lung overload of poorly soluble particles for the surrogate, with the lowest LOAEL of 0.0119 mg/L/day in a subchronic inhalation study. GreenScreen® criteria classify chemicals as a High hazard for systemic toxicity (repeated dose) when LOAELs are no greater than 0.02 mg/L/day (inhalation) (CPA 2012a).

- Authoritative and Screening Lists
 - Not on any authoritative or screening lists
- ECHA 2014
 - *Ferrosferric oxide*: In a GLP-compliant subacute inhalation toxicity study conducted according to OECD guideline 412, male Wistar rats (30/group) were exposed nose-only at concentrations of 0, 10.1, 19.7, 45.6, or 95.8 mg/m³ for 6 h/day, 5 days/week for 4 weeks. Animals were observed for up to 6 months after exposure. There was no conclusive evidence that the particles were bioavailable to extrapulmonary organs to any appreciable extent. The only effects observed were confined to the pulmonary region, consistent with a poor soluble particle (PSP) effect. The incidence and severity of broncho-alveolar hypercellularity, septal thickening were decreased after 6 months, and were essentially observed only at the highest concentration, which was high enough to cause a self-sustained type of inflammation due to substantially delayed clearance of particles (half-life = 165 days) due to lung overload. The authors identified the NOAEL at 10.1 mg/m³ (0.00721 mg/L/day⁸) with borderline effects at the LOAEL of 19.7 mg/m³ (0.0141 mg/L/day⁹).
 - *Ferrosferric oxide*: In a GLP-compliant subchronic inhalation toxicity study conducted according to OECD guideline 413, Wistar rats (20/sex/dose) were exposed nose-only at concentrations of 0, 4.7, 16.6, or 52.1 mg/m³ for 6 h/day, 5 days/week for 13 weeks. Effects observed in the lung were typical of PSP-associated effects. There was no evidence that the particles were systemically available beyond pulmonary regions. The authors identified a NOAEL at 4.7 mg/m³ (0.00336 mg/L/day¹⁰) and a LOAEL at 16.6 mg/m³ (0.0119 mg/L/day¹¹) based on increased cell counts in BAL, elevated LDH (marker of cytotoxicity), and increased beta-NAG (marker of lysosomal activities).
 - *Ferrosferric oxide*: In a GLP-compliant subacute inhalation toxicity study conducted according to OECD guideline 412, male Wistar rats (48/group) were exposed nose-only at concentrations of 0, 185.1, 195.7, or 210.2 mg/m³ for 6 h/day, 5 days/week for 2 weeks, followed by a 3-month post-exposure recovery period. No clinical signs or body weight changes were found to be treatment-related. There was no evidence of toxicity beyond the lung. Solubilized iron was detected within and around the alveolar macrophages, but not in the interstitium or hepatic tissue. Histopathological examination revealed an effect pattern consistent with that of PSP-associated effects. The authors identified the LOAEL at 185.2 mg/m³ (mg/L/day¹²), the lowest concentration tested.

Neurotoxicity (N)

Group II Score (single dose) (vH, H, M, or L): L

C.I. Pigment Black 26 was assigned a score of Low for neurotoxicity (single dose) based on lack of effects observed. GreenScreen® criteria classify chemicals as a Low hazard for neurotoxicity (single

⁸ 10.1 mg/m³ x 10⁻³ m³/L x 5 days/7days = 0.00721 mg/L

⁹ 19.7 mg/m³ x 10⁻³ m³/L x 5 days/7days = 0.0141 mg/L

¹⁰ 4.7 mg/m³ x 10⁻³ m³/L x 5 days/7days = 0.00336 mg/L

¹¹ 16.6 mg/m³ x 10⁻³ m³/L x 5 days/7days = 0.0119 mg/L

¹² 185.2 mg/m³ x 10⁻³ m³/L x 5 days/7days = 0.132 mg/L

dose) when no neurotoxicity was identified after oral doses of > 2,000 mg/kg, and there are no transient narcotic effects (CPA 2012a).

- Authoritative and Screening Lists
 - Not on any authoritative or screening lists
- Not classified as a developmental neurotoxicant (Grandjean and Landrigan 2006, 2014).
- ECHA 2014
 - In the acute oral toxicity study that identified the LD₅₀ of > 10,000 mg/kg, a single oral dose of 10,000 mg/kg was gavaged to 10 male Wistar rats followed by a 14-day observation period. There were no mortality or symptoms identified.

Group II* Score (repeated dose) (H, M, or L): DG

C.I. Pigment Black 26 was assigned a score of Data Gap for neurotoxicity (repeated dose) based on lack of data identified.

- Authoritative and Screening Lists
 - Not on any authoritative or screening lists
- Not classified as a developmental neurotoxicant (Grandjean and Landrigan 2006, 2014).
- No data were identified.

Skin Sensitization (SnS) Group II* Score (H, M, or L): DG

C.I. Pigment Black 26 was assigned a score of Data Gap for skin sensitization based on lack of data identified.

- Authoritative and Screening Lists
 - Not on any authoritative or screening lists
- No data were identified.

Respiratory Sensitization (SnR) Group II* Score (H, M, or L): DG

C.I. Pigment Black 26 was assigned a score of Data Gap for respiratory sensitization based on lack of data identified.

- Authoritative and Screening Lists
 - Not on any authoritative or screening lists
- No data were identified.

Skin Irritation/Corrosivity (IrS) Group II Score (vH, H, M, or L): L

C.I. Pigment Black 26 was assigned a score of Low for skin irritation/corrosivity based on negative data. GreenScreen[®] criteria classify chemicals as a Low hazard for skin irritation/corrosivity when adequate data are available and negative, there are no structural alerts, and they are not classified under GHS (CPA 2012a).

- Authoritative and Screening Lists
 - Not on any authoritative or screening lists
- ECHA 2014
 - When 500 mg C.I. Pigment Black 26 was applied to the skin of 2 New Zealand rabbits for 24 hours, the overall irritation score was 0 at 0, 24h, and days 5, 6, and 7. It was concluded that this substance was not irritating to the skin.

Eye Irritation/Corrosivity (IrE) Group II Score (vH, H, M, or L): L

C.I. Pigment Black 26 was assigned a score of Low for eye irritation/corrosivity based on negative data. GreenScreen[®] criteria classify chemicals as a Low hazard for eye irritation/corrosivity when adequate

data are available and negative, there are no structural alerts, and they are not classified under GHS (CPA 2012a).

- Authoritative and Screening Lists
 - Not on any authoritative or screening lists
- ECHA 2014
 - When instilled at 50 mg/animal to the eyes of 2 New Zealand White rabbits, the overall irritation score at 24h and days 2, 3, 5, 6, and 7 was 0. It was therefore concluded that C.I. Pigment Black 26 was not irritating to the eyes.

Ecotoxicity (Ecotox)

Acute Aquatic Toxicity (AA) Score (vH, H, M, or L): L

C.I. Pigment Black 26 was assigned a score of Low for acute aquatic toxicity based on measured data and very low solubility. GreenScreen[®] criteria classify chemicals as a Low hazard for acute aquatic toxicity when no effects were measured at saturation in water (CPA 2012a).

- Authoritative and Screening Lists
 - Not on any authoritative or screening lists
- ECHA 2014
 - 96h LC₀ > 100,000 mg/L in zebra fish (*Danio rerio*)
 - 48h EC₀ > 100,000 mg/L in daphnia (*Daphnia magna*)
 - A large number of studies are available in the REACH dossier, but were not performed on C.I. Pigment Black 26 or the surrogate, and were given Klimisch scores of 3 or 4. Therefore, they were not described.

Chronic Aquatic Toxicity (CA) Score (vH, H, M, or L): DG

C.I. Pigment Black 26 was assigned a score of Data Gap for chronic aquatic toxicity based on lack of reliable data.

- Authoritative and Screening Lists
 - Not on any authoritative or screening lists
- ECHA 2014
 - A large number of studies are available in the REACH dossier, but were not performed on C.I. Pigment Black 26 or the surrogate, and were given Klimisch scores of 3 or 4. Therefore, they were not described.

Environmental Fate (Fate)

Persistence (P) Score (vH, H, M, L, or vL): vH

C.I. Pigment Black 26 was assigned a score of Very High for persistence based on it being an inorganic chemical supported by Environmental Canada listing. GreenScreen[®] criteria classify chemicals as a Very High hazard for persistence when the chemical is recalcitrant (CPA 2012a).

- Authoritative and Screening Lists
 - *Authoritative:* Not on any authoritative lists
 - *Screening:* Environment Canada: DSL substances that are persistent
- As an inert, poorly water soluble inorganic chemical, C.I. Pigment Black 26 is not expected to undergo biodegradation.

Bioaccumulation (B) Score (vH, H, M, L, or vL): L

C.I. Pigment Black 26 was assigned a score of Low for bioaccumulation based on lack of bioavailability in repeated dose toxicity studies for the surrogate. GreenScreen[®] criteria classify chemicals as a Low hazard for bioaccumulation when BCF values are between 100 and 500 (CPA 2012a).

- Authoritative and Screening Lists
 - Not on any authoritative or screening lists
- As described in the repeated dose systemic toxicity section, ferrosulfate is not systemically available after inhalation exposure for 90 days. In addition, C.I. Pigment Black 26 is insoluble in water. Based on the lack of bioavailability in mammalian species, C.I. Pigment Black 26 is not expected to be bioaccumulative in aquatic biota. Confidence level was adjusted due to lack of measured data for C.I. Pigment Black 26.

Physical Hazards (Physical)

Reactivity (Rx) Score (vH, H, M, or L): L

C.I. Pigment Black 26 was assigned a score of Low for reactivity based on lack of explosiveness by structural analysis. Confidence level was adjusted due to lack of measured data. GreenScreen[®] criteria classify chemicals as a Low hazard for reactivity when they are not explosive, and there are no data indicating they are reactive otherwise (CPA 2012a).

- Authoritative and Screening Lists
 - Not on any authoritative or screening lists
- ECHA 2014
 - The structure formula of C.I. Pigment Black 26 does not contain functional groups with explosive properties as quoted in Appendix 6, Table A 6.1 of the “Recommendations on the transport of dangerous goods” Manual of Tests and Criteria, 4th revised edition.

Flammability (F) Score (vH, H, M, or L): L

C.I. Pigment Black 26 was assigned a score of Low for flammability based on measured data. GreenScreen[®] criteria classify chemicals as a Low hazard for flammability when classified as not being readily combustible according to the UN method 33.2.1 (i.e. not classifiable as flammable solid under GHS) (CPA 2012a).

- Authoritative and Screening Lists
 - Not on any authoritative or screening lists
- ECHA 2014
 - In a GLP-compliant flammability test (UN 33.2.1.4), C.I. Pigment Black 26 did not burn down or burn up. It was concluded that the test substance is not a readily combustible solid.

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United States Department of Transportation (U.S. DOT). 2008b. Classification Criteria. 49 CFR § 173. Available at: http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&tpl=/ecfrbrowse/Title49/49cfr173_main_02.tpl.

APPENDIX A: Hazard Benchmark Acronyms
(in alphabetical order)

- (AA) Acute Aquatic Toxicity**
- (AT) Acute Mammalian Toxicity**
- (B) Bioaccumulation**
- (C) Carcinogenicity**
- (CA) Chronic Aquatic Toxicity**
- (D) Developmental Toxicity**
- (E) Endocrine Activity**
- (F) Flammability**
- (IrE) Eye Irritation/Corrosivity**
- (IrS) Skin Irritation/Corrosivity**
- (M) Mutagenicity and Genotoxicity**
- (N) Neurotoxicity**
- (P) Persistence**
- (R) Reproductive Toxicity**
- (Rx) Reactivity**
- (SnS) Sensitization- Skin**
- (SnR) Sensitization- Respiratory**
- (ST) Systemic/Organ Toxicity**

APPENDIX B: Results of Automated GreenScreen® Score Calculation for C.I. Pigment Black 26 (CAS #68186-94-7)

GreenScreen® Score Inspector																						
 		Table 1: Hazard Table																				
		Group I Human					Group II and II* Human							Ecotox		Fate		Physical				
		Carcinogenicity	Mutagenicity/Genotoxicity	Reproductive Toxicity	Developmental Toxicity	Endocrine Activity	Acute Toxicity	Systemic Toxicity	Neurotoxicity	Skin Sensitization*	Respiratory Sensitization*	Skin Irritation	Eye Irritation	Acute Aquatic Toxicity	Chronic Aquatic Toxicity	Persistence	Bioaccumulation	Reactivity	Flammability			
Table 2: Chemical Details							S	R*	S	R*	*	*										
Inorganic Chemical?	Chemical Name	CAS#	C	M	R	D	E	AT	STs	STr	Ns	Nr	SNS*	SNR*	IrS	IrE	AA	CA	P	B	Rx	F
Yes	C.I. Pigment Black 26	68186-94-7	L	L	DG	DG	DG	L	L	H	L	DG	DG	DG	L	L	L	DG	vH	L	L	L
Table 3: Hazard Summary Table							Table 4					Table 6										
Benchmark		a	b	c	d	e	f	g	Chemical Name		Preliminary GreenScreen® Benchmark Score		Chemical Name		Final GreenScreen® Benchmark Score							
1		No	No	Yes	No	No			C.I. Pigment Black 26		1		C.I. Pigment Black 26		1							
2		STOP							Note: Chemical has not undergone a data gap assessment. Not a Final GreenScreen™ Score													
3		STOP							After Data gap Assessment Note: No Data gap Assessment Done if Preliminary GS Benchmark Score is 1.													
4		STOP																				
Table 5: Data Gap Assessment Table																						
Datagap Criteria	a	b	c	d	e	f	g	h	i	j	bm4	End Result										
1												1										
2																						
3																						
4																						

APPENDIX C: Pharos Output for C.I. Pigment Black 26 (CAS #68186-94-7)

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C.I. pigment black 26

CAS RN: 68186-94-7

Detailed Direct Hazard Listings [Quickscreen](#)

PBT [Environment Canada - Domestic Substances List \(DSL\)](#)
DSL substances that are Persistent - GreenScreen Benchmark Unspecified (LT-U)

EXEMPT [German FEA - Substances Hazardous to Waters \(VwVwS\)](#)
Non-Hazardous to Water (Water Hazard Class 0 NWG) - Not included in GreenScreen

Life Cycle Research

Research Status: No life cycle research started
The Pharos team has not yet researched the life cycle of this substance and has no information about chemicals of concern that may be associated with its life cycle.

Find another material:

[View Products Containing This Chemical](#)

Compound Groups
This chemical is not listed as a member of any compound groups.

GreenScreen for Safer Chemicals
Highest concern for the substance:
GreenScreen Benchmark Unspecified (LT-U)

Tags for this chemical
There are no tags for this chemical yet.

[Add a New Tag](#)

Sources
[Hazardous Substances Databank \(HSDB\)](#)
(NHIS)

CAS Variants

Sources to Check for GreenScreen® Hazard Assessment

Note: For a GreenScreen® Hazard Assessment, data queries should be initially limited to the following references. If data gaps exist after these references have been checked, additional references may be utilized.

U.S. EPA High Production Volume Information System (HPVIS):

<http://www.epa.gov/hpvis/index.html>

UNEP OECD Screening Information Datasets (SIDS):

<http://www.chem.unep.ch/irptc/sids/OECDSIDS/sidspub.html>

OECD Existing Chemicals Database: <http://webnet.oecd.org/hpv/ui/SponsoredChemicals.aspx>

European Chemical Substances Information System IUCLID Chemical Data Sheets:

<http://esis.jrc.ec.europa.eu/index.php?PGM=dat>

National Toxicology Program: <http://ntp.niehs.nih.gov/>

International Agency for the Research on Cancer:

<http://monographs.iarc.fr/ENG/Classification/index.php>

Human and Environmental Risk Assessment (HERA) on ingredients of household cleaning products:

<http://www.heraproject.com/RiskAssessment.cfm>

European Chemicals Agency (ECHA) REACH Dossiers: <http://echa.europa.eu/>

Licensed GreenScreen® Profilers

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