

SAFETY DATA SHEET

Quantum Technical Services Ltd.

Section 1. Product and Company Identification

Product Name **PRECIDIUM™ P-180D PRIMER RESIN**

Manufacturer Quantum Technical Services Ltd. (Dba Quantum Chemical)
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Section 2. Hazards Identification**2.1 Classification**

OSHA Regulatory Status: This product contains a small amount of Carbon Black which is considered hazardous in its powder form by the United States 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200); all carbon black in this product is dispersed in liquid.

WHMIS This product is not controlled.

2.2 Label Elements:

Pictogram: **None**
Signal Word: **None**
Hazard Statements: **None**
Precautionary Statements: **None**

2.3 Other Hazards

Route of Entry	Eye contact, skin contact, inhalation.
Eye Contact	Non irritant.
Skin Contact	Non irritant.
Skin Absorption	Not available.
Inhalation (Acute)	Non irritant.
Ingestion	Non irritant.
Effects of Chronic Exposure	Not available.

Carcinogenicity Carbon Black is listed as an IARC (International Agency for Research on Cancer) 2B Substance (possibly carcinogenic to humans). See also Section 11.

Section 3. Composition and Ingredient Information

<u>Common Name</u>	<u>CAS No.</u>	<u>WT%</u>
Carbon Black	1333-86-4	0.1 to 1.0 %

Note: Concentration ranges are given to protect intellectual property.

Section 4. First Aid Measures

Eye Contact	In case of contact, immediately flush eyes with plenty of water for at least 5 minutes. Consult a physician if irritation continues.
Skin Contact	In case of contact, immediately flush skin with plenty of soap and water. Remove contaminated clothing. Wash clothing before reuse.
Inhalation	If inhaled, remove to fresh air. If not breathing, give artificial respiration; if breathing is difficult, give oxygen. Obtain medical attention.
Ingestion	If ingested, consult a physician. Do not induce vomiting. Never give anything by mouth to an unconscious person.

Section 5. Fire Fighting Measures

Flash Point	>200° (CC).
Auto Ignition Temperature (C)	Not available.
Upper Explosive Limit	Not available.
Lower Explosive Limit	Not available.
Extinguishing Media	Carbon dioxide, dry chemical, foam, water spray.
Hazardous Combustion Products	By fire: Protect against potentially toxic and irritating fumes.
Sensitivity to Mechanical Impact	Not expected to be sensitive to mechanical impact.
Sensitivity to Static Discharge	Not expected to be sensitive to static discharge.
Special Fire Fighting Procedures	Cool fire-exposed containers with water spray. Heat will cause pressure build-up and may cause explosive rupture. Firefighters should be equipped with self-contained breathing apparatus to protect against potentially toxic and irritating fumes.

Section 6. Accidental Release Measures

Leak/Spill	Dike area to prevent spreading. Spills should be taken up with suitable absorbent and placed in containers. Spill area can be washed with water. Collect wash water for approved disposal. Utilize recommended protective clothing.
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Section 7. Handling and Storage

Handling Procedures	Avoid skin and eye contact. Avoid breathing dust. Remove contaminated clothing before reuse. Maintain good personal hygiene.
Storage Needs	Store in a cool and dry place, for product integrity. Store in tightly sealed container and protect from moisture and foreign materials. This product is very hygroscopic. Keep container closed when not in use.

Section 8. Exposure Controls and Personal Protection.

Protective Equipment	
Eye/Type	Liquid chemical goggles. Contact lenses should not be worn.
Respiratory/Type	At least an air purifying respirator equipped with an organic vapor cartridge and particulate pre-filters must be worn.
Gloves/Type	Rubber or plastic gloves. Butyl rubber gloves. Nitrile rubber. Barrier cream. Practice good hygiene; wash thoroughly before handling any food.
Clothing/Type	Wear adequate protective clothing.
Other/Type	Eyewash fountain. Emergency shower should be in close proximity.
Ventilation Requirements	Ventilate adequately.

Exposure Limits to Carbon Black

The table below is a summary. Please see the specific legislation for complete information. Ensure adequate ventilation to maintain exposures below occupational limits.

Carbon Black, CAS RN 1333-86-4: Argentina: 3.5 mg/m³, TWA
Australia: 3.0 mg/m³, TWA inhalable
Belgium: 3.6 mg/m³, TWA
Brazil: 3.5 mg/m³, TWA
Canada (Ontario): 3.0 mg/m³, TWA inhalable
China: 4.0 mg/m³, TWA; 8.0 mg/m³, STEL
Colombia: 3.0 mg/m³, TWA inhalable
Czech Republic: 2.0 mg/m³, TWA
Finland: 3.5 mg/m³, TWA; 7.0 mg/m³, STEL
France - INRS: 3.5 mg/m³, TWA/VME inhalable
Germany - TRGS 900: 3.0 mg/m³, TWA respirable; 10.0 mg/m³, TWA inhalable
Germany - AGW: 1.5 mg/m³, TWA respirable; 4.0 mg/m³, TWA inhalable
Hong Kong: 3.5 mg/m³, TWA
Indonesia: 3.5 mg/m³, TWA/NABs
Ireland: 3.5 mg/m³, TWA; 7.0 mg/m³, STEL
Italy: 3.0 mg/m³, TWA inhalable
Japan MHLW: 3.0 mg/m³
Japan SOH: 4.0 mg/m³, TWA; 1.0 mg/m³, TWA respirable
Korea: 3.5 mg/m³, TWA
Malaysia: 3.5 mg/m³, TWA
Netherlands - MAC: 3.5 mg/m³, TWA inhalable
Norway: 3.5 mg/m³, TWA
Spain: 3.5 mg/m³, TWA (VLA-ED)
Sweden: 3.0 mg/m³, TWA
United Kingdom - WEL: 3.5 mg/m³, TWA inhalable; 7.0 mg/m³, STEL inhalable
US ACGIH - TLV: 3.0 mg/m³, TWA inhalable
US OSHA - PEL: 3.5 mg/m³, TWA

NOTE:

- (1) Unless otherwise indicated as "respirable" or "inhalable", the exposure limit represents a "total" value. The inhalable exposure limit has been demonstrated to be more restrictive than the total exposure limit, by a factor of approximately 3.
- (2) In its facilities globally, Cabot Corporation manages to the US ACGIH TLV of 3.0 mg/m³ TWA inhalable.
- (3) As required under the EU Registration, Evaluation and Authorization of Chemicals (REACH) regulation, the Carbon Black REACH Consortium (of which Cabot Corporation is a member) developed a Derived No Effect Level (DNEL) for carbon black of 2 mg/m³ inhalable based on human health studies.

Section 9. Physical and Chemical Properties

Physical State	Liquid.
Odor	Little or no odor.
Specific Gravity	Approximately 1.1.
Odor Threshold (ppm)	Not applicable.
Vapor Pressure (mm Hg)	Not available.
Vapor Density (Air=1)	Not available.
Evaporation Rate	Not available.
Boiling Point	Not available.
pH	Not available.
Solubility in Water	Not soluble.
Freezing Point (°C)	Not available.
Melting Point (°C)	Not applicable.

Section 10. Stability and Reactivity

Incompatibility	No specific materials to avoid.
Reactivity Conditions	Exposure to high heat.
Hazardous Products of Decomposition	By fire: Carbon monoxide/dioxide. Other possibly irritating gases.

Section 11. Toxicological Information

Acute Oral Toxicity(LD50)	>5000 MG/KG (Rat).
Irritancy of material	Non irritant.
Sensitizing Capability of Material	Not available.
Teratogenicity	Not available.
Mutanagenity	Not available.
Reproductive Effects	Not available.
Synergistic Materials	None known.

Carcinogenicity of Carbon Black

ACUTE TOXICITY

Oral LD50: LD50/oral/rat = > 8000 mg/kg.

Inhalation LC50: No data available.

Dermal LD50: No data available.

STOT - Single Exposure: None observed.

Eye Irritation: Rabbit. Draize score 10-17/110 @ 24 hr. Non-irritating.

Skin Irritation: Rabbit 0.6/8 Slight irritation @ 24 hr. Non-irritating @ 48 hr.

SUBCHRONIC TOXICITY

Rat, inhalation, duration 90 days.

NOAEL = 1.0 mg/m³.

Target organ: lungs.

Effect: inflammation, hyperplasia, fibrosis.

Rat/mouse, inhalation, duration 2 years.

Target organ: lungs.

Effect: inflammation, fibrosis, tumors.

STOT - Repeated Exposure: These tests are the result of exposure under overload conditions, and the effect on rats is specific to species. As discussed below under the item of “additional information relating to hazard to human” is also relevant to prove the non-classification of carbon black concerning “specific target organs

systemic toxicity” (STOT, repeated exposure), Group 1 (lung).

CHRONIC TOXICITY:

Rat, oral, duration: 2 years. Effect: no tumors.

Mouse, oral, duration: 2 years. Effect: no tumors.

Mouse, dermal, duration: 18 months. Effect: no skin tumors.

Mouse/Hamster, inhalation, duration 12-24 months. Effect: no lung tumors.

Rat, inhalation, duration: 2 years. Target organ: lungs. Effect: inflammation, fibrosis, tumors.

Note: Tumors in the rat lung are related to the fine particle overload phenomenon rather than to a specific chemical effect of the dust particles in the lung. These effects in rats have been reported in studies on other inorganic insoluble particles and appear to be species specific. Tumors have not been observed in other species (i.e., mouse and hamster) for other insoluble particles under similar circumstances and study conditions.

Mutagenic Effects:

In Vitro: Carbon black is not suitable to be tested in bacterial (Ames test) and other in vitro systems because of its insolubility. When tested, however, results for carbon black showed no mutagenic effects. Organic solvent extracts of carbon black can, however, contain traces of polycyclic aromatic hydrocarbons (PAHs). A study to examine the bioavailability of these PAHs showed that PAHs are very tightly bound to carbon black and not bioavailable. (6)

In Vivo: In an experimental investigation, mutational changes in the hprt gene were reported in alveolar epithelial cells in the rat following inhalation exposure to carbon black. This observation is believed to be rat specific and a consequence of “lung overload” which led to chronic inflammation and release of oxygen species. (see Chronic toxicity above). This is considered to be a secondary genotoxic effect and, thus, carbon black itself would not be considered to be mutagenic.

Carcinogenic Effects:

Carcinogenicity Assessment: Tumor development in rats caused by lung overload, no epidemiological evidence for lung tumors in humans. Carbon Black is listed by IARC (International Agency for Research on Cancer). ACGIH listed carbon black as A3 “confirmed animal carcinogen with unknown relevance to humans”. Does not contain any substances listed by NTP (National Toxicology Program), OSHA (Occupational Safety and Health Administration), or EU (European Union). Carbon Black IARC Statement: In 2006 IARC re-affirmed its 1995 classification of carbon black as, Group 2B (possibly carcinogenic to humans).

In 1995 International Agency for Research on Cancer (IARC) concluded, "There is inadequate evidence in humans for the carcinogenicity of carbon black." Based on rat inhalation studies, IARC concluded that there is "sufficient evidence in experimental animals for the carcinogenicity of carbon black", resulting in their classifying carbon black as "possibly carcinogenic to humans (Group 2B)".

The U.S. National Institute of Occupational Safety and Health (NIOSH) 1978 criteria document on carbon black recommends that only carbon blacks with polycyclic aromatic hydrocarbon (PAH) levels greater than 0.1% require the measurement of PAHs in air. As some PAHs are possible human carcinogens, NIOSH recommends an exposure limit of 0.1 mg/m³ for PAHs in air, measured as the cyclohexane-extractable fraction.

Epidemiology:

Results of epidemiological studies of carbon black production workers suggest that cumulative exposure to carbon black may result in small decrements in lung function. A recent U.S. respiratory morbidity study suggested a 27 ml decline in FEV₁ from a 1 mg/m³ (inhalable fraction) exposure over a 40-year period. An older European investigation suggested that exposure to 1 mg/m³ (inhalable fraction) of carbon black over a 40-year working lifetime would result in a 48 ml decline in FEV₁. However, the estimates from both studies were only of borderline

statistical significance. Normal age-related decline over a similar period of time would be approximately 1200 ml.

The relationship between other respiratory symptoms and exposure to carbon black is even less clear. In the U.S. study, 9% of the highest exposure group (in contrast to 5% of the unexposed group) reported symptoms consistent with chronic bronchitis. In the European study, methodological limitations in the administration of the questionnaire limit the conclusions that can be drawn about reported symptoms. This study, however, indicated a link between carbon black and small opacities on chest films, with negligible effects on lung function. A study on carbon black production workers in the UK (Sorahan et al 2001) found an increased risk of lung cancer in two of the five plants studied; however, the increase was not related to the dose of carbon black. Thus, the authors did not consider the increased risk in lung cancer to be due to carbon black exposure.

A German study of carbon black workers at one plant (Wellmann et al. 2006, Morfeld et al. 2006(a), Buechte et al. 2006, Morfeld et al. 2006(b)) found a similar increase in lung cancer risk but, like the 2001 UK study, found no association with carbon black exposure. In contrast, a large US study (Dell et al. 2006) of 18 plants showed a reduction in lung cancer risk in carbon black production workers.

Based upon these studies, the February 2006 Working Group at IARC concluded that the human evidence for carcinogenicity was inadequate (Baan et al. 2006). Since this IARC evaluation of carbon black, Sorahan and Harrington (2007) re-analyzed the UK study data using an alternative exposure hypothesis and found a positive association with carbon black exposure in two of the five plants.

The same exposure hypothesis was applied by Morfeld and McCunney (2007) to the German cohort; in contrast, they found no association between carbon black exposure and lung cancer risk and, thus, no support for the alternative exposure hypothesis used by Sorahan and Harrington. Overall, as a result of these detailed investigations, no causative link between carbon black exposure and cancer risk in humans has been demonstrated. This view is consistent with the IARC evaluation in 2006.

Inhalation:

Additional information relating to hazard to human: The scientific discussion about the carcinogenic effect of inorganic low solubility particles (fine dusts) - such as carbon black - has not been concluded. In the view of many inhalation toxicologists tumour development resulted in experiments on rats through a type specific mechanism in overloading of the rat lung (overload phenomena).²⁾ Comparable findings have not yet occurred in the exposure of human beings.

The IARC however, evaluated this rat study in the monograph 65 as being a sufficient indicator of the carcinogenic properties of carbon black in tests on animals.

According to the IARC there are not sufficient indicators of the carcinogenic effect of carbon black on human beings. An overall evaluation of carbon black resulted from the IARC schematic evaluation as: "possibly carcinogenic for human beings" (Group 2B).

Applying the rules of the Globally Harmonized System of Classification and Labeling (GHS, e.g. UN "Purple Book", EU CLP Regulation) these results do not lead to classification of carbon black as a carcinogen. UN GHS says, that even if adverse effects are seen in animal studies or in-vitro tests, no classification is needed if the mechanism or mode of action is not relevant to humans.³⁾ The European CLP Regulation also mentions, that no classification is indicated if the mechanism is not relevant to humans.⁴⁾ Furthermore the CLP guidance on classification and labeling states, that "lung overload" in animals is listed under mechanisms not relevant to humans.⁵⁾

Section 12. Ecological Information

Carbon Black

Aquatic Toxicity:

Fish (*Brachydanio rerio*): LC50 (96hr) > 1,000 mg/L. (Method: OECD 203).

Daphnia magna: EC50 (24hr) > 5,600 mg/L. (Method: OECD 202).
Algae (Scenedesmus subspicatus): EC50 (72hr) > 10,000 mg/L.
Algae (Scenedesmus subspicatus): NOEC >= 10,000 mg/L.
Activated sludge: EC0 (3hr) >= 800 mg/L. (Method: DEV L3 TTC test).

Section 13. Disposal Considerations

Waste Disposal In accordance with municipal, provincial and federal regulations. Empty containers must be handled with care due to product residue. Do not heat or cut empty containers with electric or gas torch.

Section 14. Transport Information

T.D.G. Classification Non regulated.

Section 15. Regulatory Information

WHMIS Classification Non-controlled. This product has been classified in accordance with the hazard criteria of the controlled products regulations and this SDS contains all the information required by the controlled products regulations.

Section 16. Other Information

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