

CHEMICALS MEETING THE CRITERIA FOR LISTING AS CAUSING CANCER VIA THE AUTHORITATIVE BODIES MECHANISM

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The chemicals listed in the table below meet the criteria for listing under Proposition 65 via the authoritative bodies listing mechanism. The regulatory guidance for listing by this mechanism is set forth in Title 22, California Code of Regulations (CCR), Section 12306. For example, the regulations include provisions covering the criteria for evaluating the documentation and scientific findings by the authoritative body to determine whether listing under Proposition 65 is required.

The International Agency for Research on Cancer (IARC) is one of five institutions which have been identified as authoritative bodies for the purposes of Proposition 65 (22 CCR 12306(l)). IARC has identified both of the chemicals in the table below as causing cancer. OEHHA has found that these chemicals appear to be “formally identified” as causing cancer according to the regulations covering this issue (22 CCR 12306(d)). The chemicals below are the subject of reports published by the authoritative body which conclude that the chemicals cause cancer. Also, the documents specifically and accurately identify the chemicals and the documents meet one or more of the criteria outlined in 22 CCR 12306(d)(2).

OEHHA also finds that the criteria given in regulation for “as causing cancer” (22 CCR 12306(e)) have been satisfied for the chemicals in the table below. In making this evaluation, OEHHA relied upon the discussion of data by the authoritative body in making their findings that the specified chemicals cause cancer. A brief discussion of the relevant carcinogenesis studies providing evidence for the findings is presented below. The statements in bold reflect data and conclusions that appear to satisfy the criteria for the sufficiency of evidence for carcinogenicity (22 CCR 12306(e)). The full citations for the authoritative body documents are given in this report.

Chemicals Meeting the Criteria for Listing as Causing Cancer.

Chemical	CAS No.	Chemical Use	Reference
Carbon black (airborne particles of respirable size)	1333-86-4	Widely used in rubber tires, hoses, gaskets, coated fabrics; also used in printing inks, paints and plastics.	IARC (1996)
Palygorskite fibers (>5 µm in length)	12174-11-7	Pet waste absorbent; oil and grease absorbent; drilling mud; also in fertilizers and pesticides.	IARC (1997)

CARCINOGENS

Carbon black (airborne particles of respirable size) (CAS No. 1333-86-4)

Increased incidence of malignant and benign pulmonary tumors in multiple studies in female rats.

The International Agency for Research on Cancer (IARC, 1996) has identified carbon black as a Group 2B carcinogen based on sufficient evidence in experimental animals. IARC previously considered carbon black in 1984 and in 1987. Newly available data were taken into consideration in the current evaluation. The relevant studies are briefly described below.

Mauderly *et al.* (1994) [Nikula *et al.* (1995)] exposed male and female Fischer 344/N rats to furnace black via inhalation for up to 24 months. A statistically significant incidence of pulmonary neoplasms (adenomas and adenocarcinomas) was observed in exposed females. At low dose exposure, pulmonary neoplasms (6 adenocarcinomas and 1 adenoma) were observed in 7/107 “at risk” females (animals sacrificed prior to 12 months were not considered “at risk”). At high exposure, malignant neoplasms (primarily adenocarcinomas) were observed in 21/105 “at risk” females and combined malignant or benign tumors were observed in 28/105 females. No pulmonary tumors were observed in 105 control female rats. In male rats, no treatment-related tumors were observed.

Heinrich *et al.* (1994) exposed two groups of 72 female Wistar Crl:(WI)BR rats to furnace black by inhalation. One group was exposed for 43 weeks and maintained for an additional 86 weeks on clean air. The second group was exposed for 86 weeks and then maintained for 43 weeks on clean air. Two clean air control groups were kept for 129 weeks. No tumors were observed in the clear air control groups. In the 43-week exposure group, 13/72 rats developed lung tumors. In the 86-week exposure group, 6/72 rats developed lung tumors. Additionally, 6 rats in the 86-week exposure group showed lung lesions that were described as marked hyperplasia or marked squamous-cell hyperplasia and classified as borderline between non-neoplastic and neoplastic. IARC noted that the difference in the tumor rates in the two exposed groups was not statistically significant.

Heinrich *et al.* (1995) exposed 100 female Wistar Crl: (WI)BR rats to high purity furnace black for 24 months. After exposure, rats were kept in clean air for an additional 6 months. Control animals were exposed to clean air throughout. Mean lifespan of treated rats was significantly reduced compared to controls. There were increased benign and malignant lung tumors in the carbon black-treated group (39/100 or 28/100 if animals with only benign cystic keratinizing squamous-cell tumors are excluded) compared to controls (1/217).

Pott *et al.* (1994) exposed female Wistar rats to furnace black, administered intratracheally in 0.9% saline, once a week for 15 weeks. The animals were maintained until spontaneous death or were killed when moribund; all remaining animals were killed at 131 weeks. More than 50% of rats in the treated and control groups survived to 100 weeks. No primary lung tumors were observed in the control group. In carbon black-treated animals, 65% [24/37] of the rats had primary lung tumors.

Heinrich (1994) exposed female Wistar rats to one of two types of extracted carbon black (furnace black or lampblack) by intratracheal injection once a week for 16-17 weeks. After an experimental period of 27 months, the respiratory tract of the 48 treated animals per group was investigated histopathologically. Of the furnace black-treated animals, 10/48 had lung tumors. Of the lampblack-treated animals, 4/48 rats had tumors described as benign cystic keratinizing squamous-cell tumors. No lung tumors were observed in vehicle-treated controls.

Palygorskite fibers (>5µm in length) (CAS No. 12174-11-7)

Increased incidence of malignant tumors in multiple experiments in male and female rats.

IARC (1997) has identified long palygorskite fibers (>5µm in length) as a Group 2B carcinogen based on sufficient evidence in experimental animals. The relevant studies are summarized below.

In studies by Wagner *et al.* (1987), three groups of five-week old male and female Fischer 344 rats were treated with different palygorskite samples (suspended in saline) via a single intrapleural injection. Two of the groups were treated with fibers longer than 6 µm. After treatment, animals were allowed to live out their natural life span but were killed if moribund. Animals receiving palygorskite in which 0.5% of the fibers were longer than 6 µm had a statistically significant increase in pleural mesotheliomas (14/40 rats). In animals injected with a sample in which 20% of the fibers were longer than 6 µm, 30/32 had pleural mesotheliomas. The incidence in the third group in which no fibers were greater than 2 µm in length was 2/40; in saline control rats, the incidence was 1/40 and in rats treated with a positive control, the incidence was 19/39.

In a study by Pott *et al.* (1976), female Wistar rats received three intraperitoneal injections of palygorskite fibers (suspended in saline) at one-week intervals. Thirty

percent of fibers were longer than 5 μm in length. The average survival time for palygorskite-treated rats was 46 weeks after the first injection. Of 34 treated rats, 77% developed malignant tumors of the abdominal cavity, 24 mesotheliomas and 2 sarcomas.

In another study by Pott *et al.* (1987), five-week old female Wistar rats received three intraperitoneal injections of palygorskite fibers in which 3% of fibers were $\geq 5 \mu\text{m}$ in length. Treated animals had a median life span of 109 weeks. Abdominal tumors (described as sarcoma, mesothelioma or carcinoma), excluding tumors of the uterus, were reported in 12/30 rats. The tumor rate in a positive control group was 27/32. In a negative control group treated with granular titanium dioxide, the incidence was 0/32.

References

International Agency for Research on Cancer (IARC, 1996). *IARC Monographs on the Evaluation of Carcinogenic Risks to Humans*. Volume 65. Printing Processes and Printing Inks, Carbon Black and Some Nitro Compounds. IARC, Lyon, France.

International Agency for Research on Cancer (IARC, 1997). *IARC Monographs on the Evaluation of Carcinogenic Risks to Humans*. Volume 68. *Silica, Some Silicates, Coal Dust and Para-aramid Fibrils*. IARC, Lyon, France.