

# Specialty carbon black for food packaging printing inks

Technical Information 1453



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## Introduction

The safety of food is essential to all consumers. Regulations governing the actual food products and packaging materials are well established and enforced. However, it was only in the last 20 years that any regulations relating to specialty carbon black used for food packaging were issued – and initially only for plastics.

In the past the printing ink market has shown a very high growth rate for printed products for convenience foods and especially for flexible packaging. This also applies to developing countries. Increased customer demand to display more information on the packaging (e.g. best before dates, nutrition information etc.) consequently lead to higher ink consumption.

Although this is good news for the printing ink manufacturers, some ink components are not suitable for food packaging, as these require special safety regulations to protect consumer's health. Therefore it is necessary to further improve printing inks for food packaging and find alternatives that are suitable and comply with European and International standards.

European regulations primarily apply to toluene and cyclohexan extractables as well as Benzo(a)pyrene content.

We at Orion Engineered Carbons supply several products recommended for food packaging, which are suitable for indirect food contact. Our products fulfill the requirements of European regulations.

## Relevant regulations

Relevant regulations for printing inks for food packaging are:

### 1) Commission regulation (EU) No. 10/2011

"Carbon black", FCM\*-substance No 411, Ref. No. 42080 is listed as additive in Annex I "Union list" of Commission Regulation (EU) No. 10/2011 on plastic materials and articles intended to come into contact with food. This regulation and amendments is commonly named as Plastics Implementing Measure (PIM) and includes the following specification:

- Primary particles of 10 - 300 nm which are aggregated to a size of 100 - 1200 nm which may form agglomerates within the size distribution of 300 nm - mm
- Toluene extractables: maximum 0.1 %, determined according to ISO method 6209
- UV absorption of cyclohexane extract at 386 nm: < 0.02 AU for a 1 cm cell or < 0.1 AU for a 5 cm cell, determined according to a generally recognized method of analysis
- Benzo(a)pyrene content: maximum 0.25 mg/kg Carbon Black [0.25 ppm]  
For the determination of PAH content Orion Engineered Carbons is using GC-MS of a hot extract with toluene according to an established FDA procedure.

The following restriction applies to FCM-substance No. 411:

- Maximum use level of carbon black in the polymer: 2.5 % w/w

### 2) Swiss ordinance 817.023.21

The Swiss Federal Department of Home Affairs (FDHA) adopted an amendment to the ordinance of November, 23rd 2005 on materials and articles (SR 817.023.21) detailing certain provisions relating to packaging inks. Within this amendment, introduced on March, 7th 2008 and coming into force on April, 1st 2010, Article 26 g details the requirement that only permitted substances should be used in manufacturing of packaging inks.

In amendment of SR 817.023.21 (dated May, 1st 2011), Annex 6, list II, part A, carbon black is listed to packaging inks. The purity specifications for pigments are defined in Annex 1, list III, item 9.5 (November, 23rd 2005).

### 3) French AVIS Séance du 07.11.1995 (encres et vernis pour l'impression des emballages)

Specification for "carbon black"

Toluene extractables:	maximum 0.15 %
Benzo(a)pyrene content:	≤ 30 µg/kg Carbon Black [0.03 ppm]

Even though this regulation is one of the strictest, Orion Engineered Carbons products meet these requirements.

### 4) German ink ordinance

Carbon black, CAS-No. 0001333-86-4, REF-No. 42080 is listed as substance - No.346 in Table 1 (Verzeichnis der Monomere oder sonstigen Ausgangsstoffe, Farbstoffe, Lösungsmittel, Photoinitiatoren und andere Additive).

Under column 8 the following classification criteria are particularly listed. Carbon black products fulfilling all parameters could be considered to be compliant according to this regulation:

- Primary particles from 10 - 300 nm, aggregated to 100 - 1200 nm, which could built agglomerates from 300 nm - mm size.
- Toluene soluble substances: maximum 0.1 %, measured according to ISO-method 6209.
- UV-Absorption of cyclohexane extractable at 386 nm: < 0.02 AU for a measuring cell of 1 cm or < 0.1 AU for a cell of 5 cm, determined according to a commonly established analysis methodology.
- Benzo(a)pyrene content: maximum 0.25 mg/kg carbon black [0.25 ppm]  
For the determination of PAH content Orion Engineered Carbons is using GC-MS of a hot extract with toluene according to an established FDA procedure.

\*) FCM = Food Contact Material

## 5) Commission Regulation (EU) No. 1272/2013 (it shall apply from 27.12.2015)

Polycyclic Aromatic Hydrocarbons (PAHs)

The following listed PAHs are referring to the COMMISSION REGULATION (EU) No 1272/2013 of 6 December 2013 amending Annex XVII to Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) as regards polycyclic aromatic hydrocarbons.

The limits (e.g. on PAH) required according to some voluntary quality standards apply to the final consumer article, which may contain amongst others only a small amount of specialty carbon black. We would like to point out that those standards require tests on the final article, which are in the responsibility of the producer of the final article.

Substance - EU (8)	CAS-Nr.	ppm [mg/kg]
Benzo(a)anthracen	56-55-3	< 1
Chrysen	218-01-9	< 1
Benzo(b)fluoranthen	205-99-2	< 1
Benzo(j)fluoranthen	205-82-3	< 1
Benzo(k)fluoranthen	207-08-9	< 1
Benzo(e)pyren	192-97-2	< 1
Benzo(a)pyren	50-32-8	< 0.03
Dibenzo(a,h)anthracen	53-70-3	< 1

The above values are derived from random tests on single samples. Tests were conducted in accordance to FDA test method No.63. The values are given for informational purposes only in order to enable you to do an overall assessment on substance concentrations in your final product and should not be considered guaranteed specifications. The analytical investigation on PAH is not part of our standard quality and production control. We do not specify any PAH content but only confirm the compliance with purity criteria as required by a legal regulation. Related control measurements are performed on a regular basis.

Additional information in regards to GS-Mark:

Total of 18 PAHs (according to PAH-list of ZEK 01.4 - 08 for GS-Mark certification)	< 10 ppm
Benzo(a)pyren, CAS 50-32-8	< 0.03 ppm



Details on specific product recommendations can be found in the table below:

### Product recommendations

Application	Recommendation
Sheetfed	PRINTEX® 45 POWDER PRINTEX® 35 POWDER PRINTEX® Nature POWDER
Solvent based packaging	PRINTEX® 35 POWDER or BEADS SPECIAL BLACK 350 POWDER SPECIAL BLACK 535 BEADS PRINTEX® Nature POWDER or BEADS
Water based packaging for cardboard	PRINTEX® 60 POWDER or BEADS PRINTEX® 3 POWDER PRINTEX® 30 POWDER PRINTEX® Nature POWDER or BEADS
Water based packaging for film	PRINTEX® 60 POWDER or BEADS PRINTEX® 45 POWDER PRINTEX® 35 POWDER PRINTEX® Nature POWDER or BEADS
UV curing systems	SPECIAL BLACK 350 POWDER SPECIAL BLACK 275 POWDER

### Product safety information

If you want to know more about the product safety status of our products or similar named grades with origin from outside Europe, please contact us. We will be happy to answer individual questions. Our general disclaimer below applies.



### The Americas

Orion Engineered Carbons LLC  
1700 City Plaza Drive, Suite 300  
Spring, TX 77389  
USA  
Phone +1 832 445 3300

AMERICAS@orioncarbons.com

### Europe/ Middle East/ Africa

Orion Engineered Carbons GmbH  
Frankfurter Straße 60 - 68  
65760 Eschborn  
Germany  
Phone +49 6196 771 929 100

EMEA@orioncarbons.com

### Asia Pacific

Orion Engineered Carbons (China) Investment Co., Ltd.  
Room 2301, 2302, 2307, BM InterContinental Business Center  
100 Yutong Road, Jing'an District, Shanghai 20007  
P. R. China  
Phone +86 21 6107 0966

APAC@orioncarbons.com

### Incorporated in Luxemburg

Orion Engineered Carbons S.A., 6, Route de Trèves, 2633 Senningerberg, Luxembourg, Phone +352 270 48 06 0

[www.orioncarbons.com](http://www.orioncarbons.com)

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