SAFETY DATA SHEET

U.S. Department of Labor
Occupational Safety & Health Administration

Andek Firegard

SECTION 1 - IDENTIFICATION

MANUFACTURER:	Andek Corporation
ADDRESS:	850 Glen Avenue, Moorestown, NJ 08057
TELEPHONE:	1-856-786-6900
	In an emergency, contact CHEMTREC 1-800- 424-9300;
	Outside the United States call +1-703-527-3887
PRODUCT IDENTIFIER:	Andek Firegard
RECOMMENDED USE:	Intumescent Fire Retardent Coating

SECTION 2 – HAZARD IDENTIFICATION

Skin: No irritation hazard in normal industrial use.

Eyes: No irritation hazard in normal industrial use.

Inhalation: No irritation hazard in normal industrial use.

Ingestion: Ingestion of large amounts may cause nausea and/or constipation

Sensitization: Does not cause sensitization

SIGNAL WORD: Warning - No hazard in normal industrial use.

HAZARD STATEMENTS:

- Titanium dioxide has been characterized by IARC as possibly carcinogenic to humans (Group 2B) through inhalation of dust (not ingestion). This classification is based upon animal inhalation studies.
- Epidemiology studies do not suggest an increased risk of cancer in humans from occupational exposure to titanium dioxide.
- Not considered to be harmful to aquatic life.

PICTOGRAMS: None Necessary

PRECAUTIONARY STATEMENTS:

Prevention:

- **Do Not** handle until all safety precautions have been read and understood
- **Do Not** breathe dust or spray.
- **Do Not** get in eyes, on skin, or on clothing.
- Wash thoroughly after handling.
- **Do Not** eat, drink or smoke when using this product

Response:

- **Skin**: Wash affected areas thoroughly with soap and water. Wash contaminated clothing before reuse.
- **Eyes**: Use an eyewash to remove substance from eyes. Get medical advice if irritation develops.
- **Inhalation**: Call a POISON CENTER/ doctor if spray or dust is inhaled
- **Ingestion**: **Do Not** induce vomiting. Get Medical advice/attention if you feel unwell ; Rinse mouth.

Storage:

- Store in a cool dry place
- **Do Not** allow this material to freeze

Disposal:

- Waste disposal should be in accordance with existing federal, state and local environmental control laws.

SECTION 3 – COMPOSITION

CHEMICAL NAME	CAS #	APPROX %
Polyvinyl Diene Chloride/Ethylene Acetate	25085-46-5	25.0
Aluminum Trihydrate	21645-51-2	8.3
Titanium Dioxide	13463-67-7	4.6
Barium Sulfate	7727-43-7	24.0
Methyl Cellulose	9004-62-0	0.2
Fungicides	1897-45-6	0.6
Antimony Trioxide	1309-64-4	4.6
Zinc Borate	138265-88-0	4.6
Water	7732-18-5	Balance
Vinyl Acetate	108-05-4	0.5
Petroleum Distillate	64741-89-5	0.4

SECTION 4 – FIRST AID MEASURES

Skin: Wash with soap and water

Eyes: Flush with plenty of water to remove any substance in the eyes. Remove contact lenses if present. Seek medical advice if irritation develops.

Inhalation: If mist (over spray) or dust (from sanding) is inhaled, move person to fresh air. If person is not breathing, call 911 or an ambulance, then give artificial respiration. Call for medical attention.

Ingestion: Do Not induce vomiting. Seek medical attention if symptoms develop.

SECTION 5 – FIRE-FIGHTING MEASURES

Flash point: Non Flammable

Flammable limits: None Established

Extinguishing media: Water spray, foam dry chemical or carbon dioxide. Use whatever media deemed appropriate for surrounding fire.

Special fire fighting procedures: Persons exposed to products of combustion should wear self-contained breathing apparatus and full protective equipment.

Unusual fire & explosion hazards: There may be a possibility of pressure buildup in closed containers when heated. Water spray may be used to cool the containers.

Decomposition products: Carbon dioxide, Carbon monoxide, Phosphorous compounds.

SECTION 6 – ACCIDENTAL RELEASE MEASURES

Personal precautions:

- Wear safety glasses when handling this product.
- No adverse health effects expected from the clean-up of spilled material.

Cleanup procedures:

- Dike if necessary, contain spill with inert absorbent and transfer to containers for disposal.
- Keep spilled product out of sewers, watersheds, or water systems.

SECTION 7 – HANDLING & STORAGE

Precautions for safe handling:

- No special handling instructions due to toxicity.
- This product contains limited amounts of residual monomer. Under normal handling and use conditions the residual monomer should not present a hazard.
- In storage the monomer will migrate from the emulsion and establish an equilibrium between the headspace in the storage container and the liquid emulsion.
- Levels in excess of acceptable exposures can accumulate in non-vented headspaces above the emulsion.

Recommendations on the conditions for safe storage: Store in a cool, dry place.

SECTION 8 – EXPOSURE CONTROLS/PERSONAL PROTECTION:

Exposure limits:

CHEMICAL NAME	PEL	TLV
Titanium Dioxide	15 mg/m³ (8 hr. TWA)	10 mg/m³ (8 hr. TWA)
Vinyl Acetate	N/A	ACGIH TWA 10.0 ppm
Petroleum Distillate	10 mg/m³ (STEL)	ACGIH 5 mg/m³ (TWA)
Zinc Borate	Treated by ACGIH as "particulate not otherwise classified"	ACGIH - 10 mg/m³
Antimony Trioxide	0.5 mg/m³ (8 hr. TWA)	0.5 mg/m³ (8 hr. TWA)

Engineering controls:

- No exposure limits exist for the constituents of this product.
- No engineering controls are likely to be required to maintain operator comfort under normal conditions of use.

Inhalation protection:

- No respiratory protection required under normal conditions of use.
- Respirators should be selected by and used following requirements found in OSHA's respirator standard (29 CFR 1910.134).

Eye protection: Wear safety glasses when handling this product.

Skin and body protections:

- Not normally considered a skin hazard.
- Where use can result in skin contact, practice good personal hygiene.
- Wash hands and other exposed areas with mild soap and water before eating, drinking, and when leaving work.

Other hygienic practices and protective equipment: Use nitrile gloves if conditions warrant.

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES:

Appearance: Semi Thixotropic liquid
Physical state: Liquid
Color: From white and pastels to black and deep tone colors
Odor: Slight ammonia odor
Odor threshold: None established
pH: 8.0
Melting point/freezing point: 32ºF Freezing point
Initial boiling point and boiling range: 212ºF Boiling point
Flash point: Non flammable
Evaporation rate: 1.0 (water =1)
Flammability: Non flammable
Upper/lower flammability or explosive limits: None established
Vapor pressure: 23 hPa (17 mmHg) @ 20ºC (68ºF)
Vapor density: 1.24 g/cm³ @ 20ºC (68ºF)
Relative density: 1.57 kg/lt
Solubility: Soluble with water and alcohol
Partition coefficient: n-octanol/water: None established
Auto-ignition temperature: None established
Decomposition temperature: 200ºC (392ºF)
Viscosity: 110 kreb units @ 20ºC (68ºF)

SECTION 10 – STABILITY AND REACTIVITY

Reactivity: Will not occur.

Chemical stability: Stable under normal conditions.

Incompatibility: Not established

Hazardous decomposition products: Phosphorus compounds Carbon monoxide, carbon dioxide

SECTION 11 – TOXICOLOGICAL INFORMATION

The following information regarding health hazards is based upon third-party research studies.

Effects of Acute Exposure:

Inhalation: Inhalation of dust or mist can cause irritation of the eyes, nose, throat, and lungs.

Eye Contact: Like any foreign body, particles can cause mechanical irritation.

Skin Contact: This material can cause irritation if not promptly washed from the skin. This product is not expected to be absorbed through intact skin.

Ingestion: This material is not expected to produce adverse effects.

Effects of Chronic Exposure:

Numerical measures of toxicity:

CHEMICAL NAME	Oral LD50 (rat)	Dermal LD50 (rabbit)	Inhalation LC50 (rat)
Titanium Dioxide	10,000 mg/kg	10,000 mg/kg	6.8 mg/l (4 hr.)
Vinyl Acetate	2,000 mg/kg	Not irritating	Not irritating to rabbit
Petroleum Distillate	>15,000 mg/kg	>5,000 mg/kg	N/A
Zinc Borate	>10,000 mg/kg	>10,000 mg/kg	>5 mg/l
Antimony Trioxide	>20,000 mg/kg	>8,300 mg/kg	>5,200 mg/m³

Carcinogenicity:

Titanium Dioxide:

- In lifetime inhalation studies of rats, airborne respirable-size titanium dioxide particles have been shown to cause an increase in lung tumors at concentrations associated with substantial particle lung burdens and consequential pulmonary overload and inflammation. The potential for these adverse health effects appears to be closely related to the particle size and the amount of the exposed surface area that comes into contact with the lung. However, tests with other laboratory animals, such as mice and hamsters, indicate that rats are significantly more susceptible to the pulmonary overload and inflammation that causes lung cancer.
- Epidemiology studies do not suggest an increased risk of cancer in humans from occupational exposure to titanium dioxide.
- Titanium dioxide has been characterized by IARC as possibly carcinogenic to humans (Group 2B) through inhalation (not ingestion).
- It has not been characterized as a potential carcinogen by either NTP or OSHA.

Antimony Trioxide:

- (Di)antimony trioxide is classified as inhalation carcinogen category 2 (according to Regulation (EC) 1272/2008).
- Three chronic inhalation studies in rats are available for the carcinogenicity assessment of (di)antimony trioxide (Watt, 1983; Groth et al., 1986a, Newton et al., 1994). The exposure duration in all three animal studies is 12 months and thus all studies deviates from the OECD guideline on chronic toxicity/carcinogenicity, which prescribes an exposure period of 24 months for rats.
- The study by Newton et al., (1994) showed no (di)antimony trioxide-related lung tumors, neither in males nor females, at any dose level up to 4.5 mg/m³. The study shows that (di)antimony trioxide reduced the pulmonary clearance rate in a dose dependent manner. However, it is well known that reduced lung clearance rate at chronic exposure of rats to poorly soluble particles (PSPs) can result in pulmonary overload, subsequently followed by an inflammatory response, epithelial cell hypertrophy and/or hyperplasia and squamous metaplasia. The persistence of these tissue responses over chronic time periods can lead to secondary development of lung tumors (Hext, 1994).
- Due to the deviations from the OECD guidelines and the critical shortcoming in all three studies, US NTP (National Toxicology Program) has embarked on a testing program leading to a new, full 2-year bioassay; finalized end 2010 and reporting expected in 2013.
- The overall expert judgment by TC NES was that the most likely mechanism for carcinogenicity appears to be impaired lung clearance and particle overload followed by an inflammatory response, fibrosis and tumors. Consequently, (di)antimony trioxide can be regarded as a threshold carcinogen and as a starting point for a quantitative risk characterization the NOAEC of 0.51 mg/m³ derived for local repeated dose toxicity is also used for carcinogenicity. However, in this context, it is questionable whether effects caused by pulmonary overload in the rat are also relevant for humans.
- NOAEC: 0.51 mg/m³ / Target organ: respiratory: lung

Zinc Borate:

- No experimental test data.
- Carcinogenicity and mutagenicity tests were negative for boric acid.
- Limited epidemiology studies have shown no relationship between cancer in humans and occupational exposure to zinc compounds.
- Human epidemiological studies show no increase in pulmonary disease in occupational populations with chronic exposures to boric acid dust and sodium borate dust.

Reproductive toxicity:

Antimony Trioxide:

- Based on the available long-term toxicity studies in rodents (Omura et al, 2002) and the relevant information on the toxicokinetic behavior in rats, it is concluded that the classification criteria for reproductive toxicity are not met because of the lack of absorption and systemic distribution, and a correspondingly negligible exposure of reproductive organs in male and female mammalian species to ATO.
- The reference Schroeder R.E. (2003) was identified as key study for developmental toxicity and will be used for classification and labeling. This study suggests that the NOAEC for developmental toxicity is >6.3 mg ATO/m³. Thus, based on available data, the classification criteria as developmental toxicant according to regulation (EC) 1272/2008 are not met

Zinc Borate:

- No experimental test data.
- Animal feeding studies with boric acid and sodium tetraborate in rat, mouse and dog, at high doses, have demonstrated effects on fertility and testes.
- Studies with boric acid in rat, mouse and rabbit, at high doses, demonstrate developmental effects on the foetus including foetal weight loss and minor skeletal variations. The doses administered were many times in excess of those which humans would normally be exposed to.
- Animal studies have also demonstrated developmental toxicity due to excess zinc levels, including increased foetal resorption and reduced foetal weights. However, zinc is essential for normal foetal development.
- Human epidemiological studies show no increase in pulmonary disease in occupational populations with chronic exposures to boric acid dust and sodium borate dust.
- A recent epidemiology study under the conditions of normal occupational exposure to borate dusts indicated no effect on fertility.

STOT-single exposure:

Antimony Trioxide: Based on available data, the classification criteria as STOT-single exposure, oral and inhalation are not met since no reversible or irreversible adverse health effects were observed immediately or delayed after exposure.

STOT-repeated exposure:

Antimony Trioxide: $NOAEC_{inhalation}$ = 0.51 mg/m³ (Newton et al, 1994)
$NOAEL_{oral}$ = 1686 mg/kg/d (Hext et al, 1999)

- The NOAEC was determined in a study with a high background incidence of lung inflammation in controls, therefore there is considerable uncertainty regarding the reliability of this numerical value. The NOAEC is based on impaired lung clearance that was observed at 4.50 mg/m³.
- Based on available data, the classification criteria as STOT-repeated exposure, oral are not met since no reversible or irreversible adverse health effects were observed immediately or delayed after exposure (NOAEL is above the guidance value).
- Based on available data, the classification criteria as STOT-repeated exposure, inhalation are not met since there is an absence of consistent identifiable toxic effects other than the non-specific PSP overload, which is an adaptive response not triggering a STOT classification.

Aspiration hazards:

Antimony Trioxide: ATO as an inorganic metal oxide is void of a low surface tension effect and as a solid does have a very high viscosity, i.e. an aspiration hazard can safely be excluded. Based on available data, the classification criteria are not met.

SECTION 12 – ECOLOGICAL INFORMATION

Data from toxicity test (aquatic and/or terretrial organism where available):

CHEMICAL NAME	Algae/Aquatic Plants EC50	Fish LC50	Toxicity to Microorganism EC10	Crustacea (Aquatic Invertebrates) LC50
Chlorothalonil (ISO)	120 h - 0.21 mg/l (Selenastrum capricornufum)	96 h - 62 mg/l (Bluegill sunfish)	N/A	N/A
Vinyl Acetate	N/A	96 h - >100 mg/l (Rainbow trout)	0.5 h >1000 mg/l (sludge)	N/A
Zinc Borate	N/A	96 h - 2.4 mg (Rainbow trout)	N/A	48 h. - 76 mg (Daphnia magna Straus)
Antimony Trioxide	72 h - > 36.6 mg/l (Pseudokirchneriella subcapitata)	96 h - 14.4 mg/l (Pimephales promelas)	14 d NOEC - 78 mg /kg (Chironomus riparius)	96 h - 1.77 mg/l (Chlorohydra viridissimus)

Chronic aquatic toxicity test:

Fish [Pimephales promelas]	28 d NOEC/LOEC (growth; length)	1.13/2.31 mg Sb/L (Kimball, 1978)
Invertebrates [*Daphnia magna*]	21 d NOEC/LOEC (reproduction)	1.74/3.13 mg Sb/L (Heijerick et al, 2003)
Algae [Pseudokirchneriella subcapitata]	72 h NOEC/LOEC (growth rate)	2.11/4.00 mg Sb/L (Heijerick et al, 2004)

Biodegradation:

- Chlorothalonil (ISO) is not readily biodegradable
- Polymer component is not readily biodegradable. Elimination by absorption to activated sludge. Separation by flocculation is possible.
- Antimony Trioxide formally meets the criterion for persistence based on the absence of any degradation, this criterion is considered not to be applicable to inorganic elements. In addition, under conditions of a standard EUSES lake and the median partition coefficient for suspended matter, antimony meets the criteria for rapid removal from the water column.
- Zinc Borate:
  1. Both boron and zinc occur naturally in sea water at average concentrations of 5 mg B/l and 8 mgZn/l respectively and at lower concentrations, generally, in fresh water.
  2. ZB can decompose, under certain environmental conditions, to form sparingly water soluble zinc hydroxide and water soluble boric acid.

Bioaccumulation potential:

- Antimony Trioxide does not meet the criteria for bioaccumulation: a BCF for aquatic organisms of 40 and a BSAF of 1 for earthworms are derived, and are all much lower than the threshold of 2,000 l/kg. Also, there is evidence to support that antimony does not biomagnify in the food chain. Therefore, antimony is not considered bioaccumulative (B) or very bioaccumulative (vB) based on the definitive criteria.
- Zinc Borate: Low bioaccumulation potential; log P_{ow} < 0.2, based on zinc (4:1) borate monohydrate. Additionally, ZB will undergo hydrolysis in water to form boric acid and zinc hydroxide. Neither of these substances will biomagnify through the food chain.

Mobility in soil:

- Antimony Trioxide: A log Kp of 2.07 has been determined for soil
- Zinc Borate : The product is sparingly soluble in water and may be leachable through normal soil.

Phytotoxicity:

- Zinc Borate : Boron is an essential micronutrient for healthy growth of plants. However, it can be harmful to boron sensitive plants in higher quantities. Care should be taken to minimize the amount of borate product released to the environment.

Results of PBT and vPvB assessment for Antimony:

- The PBT and vPvB criteria of Annex XIII to the Regulation do not apply to inorganic substances, such as antimony and its inorganic compounds.
- The available data have been compared to the criteria. See information on **Biodegradation** for (P), **Bioaccumulation potential** for (B) and **Chronic aquatic toxicity test** for (T). The lowest NOEC is 1.13 mg Sb/L for fish (Kimball, 1978).
- Antimony and antimony compounds do not meet any of the toxicity criteria based on carcinogenicity, mutagenicity or reprotoxicity (section 11 of this SDS) and there is no evidence of other chronic concerns. Therefore, antimony is not considered toxic (T) based on the definitive criteria
- Antimony, and therefore (di)antimony trioxide, is not PBT or vPvB.

Other adverse effects:

- Amount of Chlorothalonil (ISO) present in product is below the level considered to constitute as aquatic environmental hazard.
- (Di)antimony trioxide is not expected to contribute to ozone depletion, ozone formation, global warming or acidification.

SECTION 13 – DISPOSAL CONSIDERATIONS

To the best of our knowledge, this product does not meet the definition of hazardous waste under the U.S. EPA Hazardous Waste Regulations 40 CFR 261. Solidify and dispose of in an approved landfill. Consult state, local or provincial authorities for more restrictive requirements.

SECTION 14 – TRANSPORT INFORMATION

UN #	N/A
UN PROPER SHIPPING NAME:	Paint
HAZARD CLASS:	N/A
PACKING GROUP:	N/A
ENVIRONMENTAL HAZARDS:	N/A
GUIDANCE ON TRANSPORT IN BULK:	N/A

Transport labels required: This product is not regulated by the D.O.T.

SECTION 15 – REGULATORY INFORMATION

US Federal Regulation:

SARA 311/312 Hazard Categories:

CHEMICAL NAME	CAS #	Hazard	Upper limit %	Hazardous Substances RQs	CERCLA/SARA RQ	TPQ
Vinyl Acetate	108-05-4	Delayed Chronic Health Hazard	<0.5	1,000 lbs	5,000 lbs	5,000 lbs

SARA 313:

CHEMICAL NAME	CAS #
Chlorothalonil (ISO)	1897-45-6

US State Right to Know Regulations: New Jersey, Massachusetts, Pennsylvania, Rhode Island

CHEMICAL NAME	CAS #
Vinyl Acetate	108-05-4
Chlorothalonil (ISO)	1897-45-6
Titanium Dioxide	13463-67-7

CA Prop 65

CHEMICAL NAME	CAS #	
Chlorothalonil (ISO)	1897-45-6	Although present, is at a level below that which requires a proposition 65 warning.
Titanium Dioxide	13463-67-7	Although present, is bound within the matrix of the product and is not considered to be within the hazard criteria.
Acetaldehyde	75--07-0	Less than 0.001% of the total volume
1,4-Dioxane	123-91-1	Less than 0.001% of the total volume
Ethylene oxide	75-21-8	Less than 0.001% of the total volume

Canada

CHEMICAL NAME	CAS#
Titanium Dioxide	13463-67-7
Vinyl Acetate	108-05-4

SECTION 16 – OTHER INFORMATION (HMIS RATING)

Health	1
Flammability	0
Physical Hazard	0
Personal Protection	B

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