



MATERIAL SAFETY DATA SHEET

Section 1: Product and Company Information

Product Name(s): ThermoRange System™ (TRS) Insulation; TRS-10, TRS-20, TRS-30, TRS-40, TRS-50.

Manufacturer: Owens Corning, One Owens Corning Parkway, World Headquarters, Attn. Product Stewardship, Toledo, OH, 43659, Telephone: 1-419-248-8234 (8am-5pm ET weekdays).

Emergency Contacts:

Emergencies ONLY (after 5pm ET and weekends): 1-419-248-5330,
CHEMTREC (24 hours everyday): 1-800-424-9300,
CANUTEC (Canada- 24 hours everyday): 1-613-996-6666.

Health and Technical Contacts:

Health Issues Information (8am-5pm ET):1-419-248-8234,
Technical Product Information (8am-5pm ET): 1-419-248-8335.

Section 2: Composition and Ingredient Information

<u>Common Name</u>	<u>Chemical Name</u>	<u>CAS No.</u>	<u>Wt. %</u>
Fiber Glass Wool	Fibrous Glass	65997-17-3	85-99
Cured - Acrylic Binder	Acrylic Thermoset Polymer	None	1 - 15

Note: See Section 8 of MSDS for exposure limit data for these ingredients. Refer to Section 10 for thermal decomposition products generated in hot end-use applications.

Section 3: Hazards Identification

Appearance and Odor: White fibrous material with faint resin odor.



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Emergency Overview

Acrid fumes, smoke and gases may be generated in a fire.

Primary Route(s) of Exposure: inhalation, skin, eye

Potential Health Effects:

ACUTE (short term): Fiber glass wool is a mechanical irritant and may cause temporary irritation of the respiratory tract, skin and eyes. See Section 8 for exposure controls.

CHRONIC (long term): Fiber glass wool is a possible cancer hazard. Use of these products has not been shown to cause cancer in humans. Fiber glass wool caused cancer in animals through unnatural routes of exposure (surgical implantation), but has not produced cancer by inhalation. See Section 11 of MSDS for an explanation of the toxicological data.

Medical Conditions Aggravated by Exposure: Chronic respiratory or skin conditions may temporarily worsen from exposure to these products.

Section 4: First Aid Measures

Inhalation: Move person to fresh air. Administer cardiac or pulmonary resuscitation (CPR) if a pulse is not detectable or if unable to breathe. Provide oxygen if breathing is difficult. Obtain immediate medical assistance if irritation persists.

Eye Contact: Flush eyes with running water for at least 15 minutes. Seek medical attention if irritation persists.

Skin Contact: Wash with mild soap and running water. Use a washcloth to help remove fibers. To avoid further irritation, do not rub or scratch irritated areas. Rubbing or scratching may force fibers into skin. Seek medical attention if irritation persists.

Ingestion: Ingestion of this material is unlikely. If it does occur, observe individual for several days to insure that intestinal blockage does not occur.



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Section 5: Fire Fighting Measures

Flash Point and Method (°F): None.

Flammability Limits (%): None.

Auto Ignition Temperature (°F): Not Applicable.

Extinguishing Media: Water, foam, CO₂ or dry chemical.

Unusual Fire and Explosion Hazards: These products may release acrid smoke, gases or vapors in a sustained fire.

Fire Fighting Instructions: Use self contained breathing apparatus (SCBA) and full bunker turnout gear in a sustained fire.

Hazardous Combustion Products: Primary combustion products are carbon monoxide, carbon dioxide, formaldehyde, acrolein, acetaldehyde and water. Additional volatile organic compounds including acetic acid, acetophenone, phenol, a-methyl styrene, benzaldehyde, 2-ethyl-1-hexanol, benzofuran, xylenes, and heptanal, may be released depending on conditions of combustion.

Section 6: Accidental Release Measures

Land Spill: Scoop up or vacuum material and put into suitable container for disposal as a non-hazardous waste.

Water Spill: This material will sink and disperse along the bottom of waterways and ponds. It can not easily be removed after it is waterborne, however, the material is non-hazardous in water.

Air Release: This material will settle out of the air. It can then be scooped up or vacuumed for disposal as a non-hazardous waste.



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Section 7: Handling and Storage

Storage Temperature: Not applicable.

Storage Pressure: Not applicable.

General: No special storage or handling procedures are required for this material. When the temperature of the surface being insulated exceeds 600 degrees F (315 degrees C), the binder in these products undergoes thermal decomposition. In self-cleaning ranges, the temperature can reach up to 850 degrees F during the self-cleaning cycle. Decomposition products will be liberated when the self-cleaning cycle.

Section 8: Exposure Controls and Personal Protection

<u>Substance</u>	<u>OSHA PEL</u> (8-hr TWA)	<u>ACGIH TLV</u> (8-hr TWA)
Fibrous glass (wool)	5 mg/m ³ (respirable dust) 15 mg/m ³ (total dust) 1 fiber/cc (respirable, proposed) (respirable)	10 mg/m ³ (inhalable fraction) 3 mg/m ³ (respirable) 1 fiber/cc (respirable)
Cured Binder	None Established	None Established
Formaldehyde	0.75 ppm TWA 2 ppm STEL	0.3 ppm Ceiling
Acetaldehyde	100 ppm TWA 150 ppm STEL	25 ppm (ceiling)
Acrolein	0.1 ppm TWA 0.3 ppm STEL	0.1 ppm (ceiling)

Ventilation: General dilution ventilation and/or local exhaust ventilation should be provided as necessary to maintain exposures below occupational exposure limits.



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Provide mechanical exhaust ventilation or general dilution ventilation in when insulation is exposed to surface temperatures above 600 °F (315° C); this includes when insulated ranges are operated in the self-cleaning mode. Keep kitchen and associated areas well ventilated during the self-cleaning cycle and cool down period. Turn on kitchen fans, vent hoods, other exhaust fans, and/or install portable window fans to remove or dilute smoke and odors. Open outside windows or doors to provide fresh air.

Personal Protection:

Respiratory Protection:

Fiber Glass wool: A properly fitted NIOSH/MSHA approved disposable dust respirator such as the 3M model 8210 (formerly 8710) or model 8271 (formerly 9900) in high humidity environments) or equivalent should be used when: high dust levels are encountered; the level of glass fibers in the air exceeds the occupational exposure limits; or if irritation occurs.

Use respiratory protection in accordance with respirator manufacturer's instructions and in accordance with your company's respiratory protection program, local regulations and OSHA regulations under 29 CFR1910.134.

Hot Use Applications: Wear appropriate respiratory protection when local exhaust and general dilution ventilation is not adequate to control thermal decomposition emissions in hot use applications where insulation contacts surfaces exceeding 600°F (315 °C). A full-face air-purifying respirator with formaldehyde cartridges should be used where exposures to formaldehyde exceed the occupational exposure limits or if eye, nose, throat or lung irritation occurs.

Airborne concentrations should be assessed to determine the appropriate type of respiratory protection to be used. When in doubt, use supplied air respiratory protection.

Skin Protection: Loose fitting long sleeved shirt, long pants and gloves when installing or removing insulation.

Eye Protection: Safety glasses, goggles or face shield.



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Section 9: Physical and Chemical Properties

Vapor Pressure (mm Hg @ 20°C): Not Applicable

pH: Not Applicable

Vapor Density (Air=1): Not Applicable

Specific Gravity (Water=1): Not Applicable

Boiling Point: Not Applicable

Solubility in Water: Insoluble

Viscosity: Not Applicable

Appearance: White fibrous

Physical State: Solid

Odor Type: Organic

Freezing Point: Not Applicable

Evaporation Rate (n-Butyl Acetate=1): Not Applicable

Section 10: Stability and Reactivity

General: Stable

Incompatible Materials and Conditions to Avoid: None

Hazardous Decomposition Products:

Emissions Testing: A typical commercially available electric range insulated with ThermoRange Systems Insulation was tested in a large environmental chamber (25.7 m³) to determine concentrations of airborne emissions during the initial self-cleaning cycle. The oven temperature reached a maximum of 830 °F near the end of the 3 hour self-cleaning cycle. Thermal decomposition products measured during the initial 3-hour self-cleaning and cool down periods included:

Contaminant	Time Interval After Start of Self-Cleaning Cycle				
	1 st Hour	2 nd Hour	3 rd Hour	4 th Hour	5 th to 8 th Hrs
Carbon Monoxide	0 to 3 ppm	4 to 16 ppm	16 to 12 ppm	12 to 4ppm	4 to 0.5 ppm
Formaldehyde	0.19 ppm	1.70 ppm	1.54 ppm	1.62 ppm	0.52 ppm
Acetaldehyde	0.18 ppm	0.71 ppm	0.93 ppm	0.84 ppm	0.30 ppm
Acrolein	0.05 ppm	0.42 ppm	0.32 ppm	0.28 ppm	0.06 ppm
Total VOCs	0.47 mg/m ³	3.17 mg/m ³	2.01 mg/m ³	2.09 mg/m ³	0.81 mg/m ³
Oven Temp.	79 to 745 °F	745 to 815°F	816 to 830 °F	830 to 327 °F	323 to 113 °F
← Self-cleaning Cycle →				← Cool Down Period →	

The emissions data reported in the table above may not be representative of emissions from all designs of ranges or under all self-cleaning conditions.



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Concentrations of airborne emissions from an insulated electric range during self-cleaning in an actual end use conditions in a house are expected to be much lower than concentrations measured in the large environmental chamber. Concentrations of emissions from a range in end-use in a "typical kitchen" (1200 ft² house with an 8 foot ceiling) are expected to be a order of magnitude (about 10 times) lower than concentrations that accumulated in the "large environmental testing chamber."

A typical 1200 ft² house has a larger volume of the kitchen (272 m³) relative to the test chamber (25.7 m³), dissipation to connected rooms due to thermal currents, mixing effects of forced air HVAC system, and local exhaust fans. These major differences reduce indoor air contaminant concentrations. Historical range emission tests indicate that carbon monoxide and formaldehyde peak concentrations are reached fairly quickly and then rapidly dissipate, unlike the emission profiles in a large environmental chambers which is a confined apparatus with a limited air exchange rate (~ 1 ACH).

Hazardous Polymerization: Will not occur.

Section 11: Toxicological Information

CARCINOGENICITY: The table below indicates whether or not each agency has listed each ingredient as a carcinogen:

<u>Substance</u>	<u>ACGIH</u>	<u>IARC</u>	<u>NTP</u>	<u>OSHA</u>
Fiber Glass Wool	A3	2B	Yes	No
Cured Resin	No	No	No	No
Formaldehyde	A2	2A	Yes	Yes
Acrolein	A4	3	No	No
Acetaldehyde	A3	2B	Yes	No

A2: Suspected Human Carcinogen
A3: Animal Carcinogen
A4 Not Classifiable as a Human Carcinogen
2A Probably carcinogenic to humans
2B Possibly carcinogenic to humans
3 Not classifiable as to its carcinogenicity to humans.

<u>Substance</u>	<u>LD50 Oral</u> (mg/kg)	<u>LD50 Dermal</u> (mg/kg)	<u>LC50 Inhalation</u> (ppm, 4 hrs.)
Fiber Glass Wool	Not Available	Not Available	Not Available
Cured Resin	Not Available	Not Available	Not Available
Formaldehyde	500-800 (rat)	270 (rabbit)	250-478 (rat)
Acrolein	26 (rat)	200 (rabbit)	Not Available
Formaldehyde	100 (rat);42 (mice)	Not Available	165 (rat)
Acetaldehyde	661 (rat)	Not Available	13,300 (rat)



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Combustion Toxicity Testing

ThermoRange System Insulation (~ 2% binder) was tested for combustion toxicity using the acute lethality endpoint in accordance with Article 15 Part 1120 - NY State Uniform Fire Prevention and Building Code. Groups of mice (n = 4 Male Swiss Webster 22-20 g body-weight) were exposed to combustion products from 100 g, 299 g and 367 g samples of ThermoRange Insulation. The insulation was heated from 110 °C at a rate of 20 (± 2) °C per minute. The animals were exposed to the thermal decomposition products for 30 minutes from the time that test samples lost 1% of their initial weight (T_{1%}). At the end of the exposure period and a 10-minute recovery period, the test animals were observed for lethality and examined for eye damage.

The combustion products from ThermoRange System Insulation caused no lethality (no deaths) in test animals for all sample groups (0 deaths per group). The maximum concentration of carbon monoxide generated was 670 ppm, 1316 ppm and 1706 ppm, respectively, for samples tested. There was no damage to eyes of any test animals (no abnormal eye effects were observed).

At the maximum insulation sample size that could be tested in the furnace 366.7 grams, there were no deaths in the test animals. An actual LC₅₀ could not be determined due to the large sample weight required. Thus, ThermoRange System Insulation has an LC₅₀ greater than 366.7 grams (LC₅₀ > 366.7 grams).

Fiber Glass Wool: The International Agency for Research on Cancer (IARC) in June, 1987, classified fiber glass wool as possible cancer causing agent to humans (Group 2B). This classification was based on a combined evaluation of published human and animal studies. The human data included large scale mortality studies of U.S. and European fiber glass wool factory workers. IARC concluded that the human studies did not provide sufficient evidence that fiber glass wool caused cancer in humans. The classification of fiber glass wool as a possible carcinogen to humans was substantially based on experimental animal studies in which they were exposed to wool glass fibers through non-natural routes, such as injection or implantation. IARC regards it prudent to treat a material with sufficient evidence of carcinogenicity in animals as if it is a possible carcinogen in humans.

In May 1997, the American Conference of Governmental Industrial Hygienists (ACGIH) adopted an A3 carcinogen classification for synthetic vitreous fibers - glass wool insulation. The classification is the result of a lengthy review process.

The ACGIH A3 classification considers glass wool to be carcinogenic in experimental animals at a relatively high doses, by routes of administration, at sites, or by mechanisms that it does not consider relevant to worker exposure. It also reviewed the available epidemiological studies and concluded that they do not confirm an increased risk of cancer in exposed humans. Overall the ACGIH



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found that the available medical/scientific evidence suggests that glass wool is not likely to cause cancer in humans except under uncommon or unlikely routes or levels of exposure.

The TLV-TWA of 1 respirable fiber/cc was adopted to prevent irritation of the respiratory tract or any possible long-term respiratory health effects in workers.

ANIMAL STUDIES

Over the last 50+ years there have been numerous studies on the potential health effects of glass fibers in animals. There are two major types of animal studies: 1) inhalation where the animals breathe the glass wool fibers, and 2) instillation studies where the fibers are injected or surgically implanted directly into the animal. Inhalation is most similar to the way that humans are exposed to fibers.

Animal inhalation experiments in which laboratory animals were exposed to large quantities of glass wool fibers have not resulted in a positive association between glass fibers and fibrosis, lung cancer or mesothelioma. When large quantities of glass wool fibers were injected or surgically implanted into sterile, sensitive body cavities of experimental animals they have produced mesotheliomas but not fibrosis or lung cancer.

Another type of glass fibers, special purpose, in 1997, for the first time, produced fibrosis, lung cancer and mesothelioma in rats. Those special purpose glass fibers were different from these glass wool fibers in composition, biosolubility and end use.

All glass wool fibers manufactured by Owens Corning are designed to not be biopersistent. That is, should they be respired into the lungs, they will be removed by either the lung's mechanical clearance mechanisms or be dissolved, in such a short period of time, that they will not cause fibrosis, lung cancer or mesothelioma.

EPIDEMIOLOGY

There have been numerous studies of workers exposed to glass wool. A small study of Canadian glass wool workers reported a statistically significant increase in lung cancer mortality. The study did not demonstrate a correlation between fiber glass wool exposure and disease.

Large scale studies published in 1987 which examined the mortality rates of U.S. and European fiber glass wool factory workers found no statistically significant differences in lung cancer rates between those workers and the populations in their local or regional communities. A 1990 update of the U.S. cohort reported a



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small statistically significant excess for respiratory cancer in workers when compared with populations in their local communities. While the overall mortality rates in these mortality studies were slightly raised and did increase (but not significantly) with time since the first exposure, the increases were not related to duration of exposure or to an estimated time weighted measure of exposure.

Georgetown University recently studied the oldest and largest fiber glass plant in the U.S. The results indicate that smoking was the likely cause of this cancer excess. A study at the University of Massachusetts is investigating other possible factors.

A large recently completed morbidity study reported no association with fiber glass exposure and non-malignant respiratory disease. Another smaller screening of workers at a plant that manufactured appliances concluded that fiber glass wool appeared to produce "asbestosis" in the workers. That study has been severely criticized for many reasons, not the least of which is its failure to factor in the workers exposures to asbestos.

Formaldehyde: In March 1987 the International Agency for Research on Cancer (IARC) upgraded their overall evaluation of formaldehyde gas, based on evidence of carcinogenicity in humans, from a possible human carcinogen (Group 2B based on inadequate evidence in humans) to a probable human carcinogen (Group 2A based on limited evidence in humans). A number of new epidemiological studies on persons in a variety of occupations with potential exposure to formaldehyde were used in the evaluation. Cancers that occurred in excess in more than one study are: Hodgkin's disease, leukemia, and cancers of the buccal cavity and pharynx (particularly nasopharynx), lung, nose, prostate, bladder, brain, colon, skin and kidney.

Exposure to formaldehyde at concentrations in excess of 1 ppm may cause significant irritation of the eyes and upper respiratory tract. The irritation threshold appears to be about 0.3 ppm. Pulmonary sensitization, although rare, does occur in humans. Formaldehyde solutions can cause severe eye and moderate skin irritation. Repeated skin exposure to solutions of 2% or more formaldehyde has caused allergic skin reactions. Formaldehyde was found to be weakly active in a number of *in vitro* genotoxicity tests, but inactive *in vivo*. Formaldehyde did not cause birth defects in offspring of female mice who were exposed to concentrations up to 10 ppm. Lifetime inhalation of formaldehyde at concentrations above 5 ppm for 6 hours per day, caused nasal tumors in laboratory animals. Many epidemiological studies have failed to link cancer in humans with occupational exposure to formaldehyde.



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The American Conference of Governmental Industrial Hygienists (ACGIH) A2 designation, suspected human carcinogen, is based on cancer in experimental animals and conflicting or insufficient epidemiologic studies of workers. The recommended ceiling TLV of 0.3 ppm for workplace air formaldehyde is based on evidence of irritation of occupational exposure to formaldehyde as well as human formaldehyde exposures in other settings.

Acetaldehyde: Acetaldehyde was tested for carcinogenicity in rats by inhalation and in hamsters by inhalation and by intratracheal instillation. It produced tumors of the respiratory tract following its inhalation, particularly adenocarcinomas and squamous-cell carcinomas of the nasal mucosa in rats and laryngeal carcinomas in hamsters. In hamsters, it did not result in an increased incidence of tumors following intratracheal instillation. Inhalation of acetaldehyde enhanced the incidence of respiratory-tract tumors induced by intratracheal instillation of benzo[a]pyrene in hamsters. Based on these data the IARC concluded that Acetaldehyde is possibly carcinogenic to humans (Group 2B).

Section 12: Ecological Information

This material is not toxic to animals, plants or fish.

Section 13: Disposal Considerations

RCRA Hazard Class: Non-hazardous.

Section 14: Transport Information

DOT Shipping Names: Not regulated

Hazard Class or Division: None

Identification No.: None

Label(s) required (if not excepted): None

Secondary: None

Packing Group: None



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Special Provisions: None

Packaging Exceptions: None

Non-bulk Packaging: None

Bulk packaging: None

EPA Hazardous Substances: None

RQ: None

Quantity Limitations: Passenger Aircraft: None Cargo Aircraft: None

Marine Pollutants: None

Freight Description: (NMFC)

Hazardous Material Shipping Description: None

Transportation of Dangerous Goods - Canada

Proper Shipping Name: Not Regulated

TDG Hazard Classification: (Primary): None (Secondary): None

IMO Classification: None

ICAO/IATA Classification:

Product Identification Number: None

Packing Group: None

Control Temperature: None

Emergency Temperature: None

Schedule XII Quantity Restriction: None

Reportable Quantity for US Shipments: None

IATA Packing Instructions:

Passenger/Cargo: None

Cargo Only: None

Limited Quantity: None

Maximum Net Quantity per Package:

Passenger/Cargo: None

Cargo Only: None

Limited Quantity: None

Special Provisions: None



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Section 15: Regulatory Information

TSCA Status: All ingredients are listed on the TSCA inventory or are not required to be listed on the TSCA inventory.

NSR Status (Canada): All ingredients are listed on the DSL or are not required to be listed on the DSL.

SARA Title III:

Hazard Categories:

Acute Health: Yes
Chronic Health: Yes
Fire Hazard: No
Pressure Hazard: No
Reactivity Hazard: No

Reportable Ingredients:

Sec. 302/304: None
Sec. 313: None

California Proposition 65: Fiber glass wool (respirable size) is known to the State of California to cause cancer.

Clean Air Act: Acrolein, acetaldehyde and Formaldehyde are listed as a hazardous air pollutants.

WHMIS (Canada): Status: Controlled

WHMIS Classifications: D2A - Carcinogenicity

Section 16: Other Information

HMIS and NFPA Hazard Rating:	Category	HMIS	NFPA
	Acute Health	1	1
	Flammability	0	1
	Reactivity	0	0

NFPA Unusual Hazards: None.

HMIS Personal Protection: To be supplied by user depending upon use.

Revision Summary: This is a new MSDS. Read this information carefully.