1. Identification

Product identifier **Hydrofluoric Acid 7 - 60%**

Other means of identification

Synonyms Hydrofluoric Acid 5:1 * Hydrofluoric Acid 1:1 * Hydrofluoric Acid 40% * Hydrofluoric Acid 49% * Hydrofluoric Acid 50% * Hydrofluoric Acid 59.5% * Hydrofluoric Acid 60% * Hydrofluoric Acid 49-60%

Recommended use Industrial use.

Recommended restrictions None known.

Manufacturer/Importer/Supplier/Distributor information

Manufacturer/Supplier CMC Materials; 870 North Commons Drive; Aurora, IL 60504; United States

Telephone +1.630.375.6631

Manufacturer/Supplier CMC Materials; Amber Business Centre; Riddings Alfreton Derbyshire DE55 4DA; United Kingdom

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Emergency phone number

3E Global Incidence Response Hotline

USA +1.866.519.4752

International +1.760.476.3962

Access code 333035

CHEMTREC For Dangerous Goods Incidents ONLY (spill, leak, fire, exposure or accident), call CHEMTREC 24/7 at:

Canada, USA +1.800.424.9300

International +1.703.741.5970

2. Hazard(s) identification

Physical hazards Not classified.

Health hazards

Acute toxicity, oral	Category 2
Acute toxicity, dermal	Category 1
Acute toxicity, inhalation	Category 2
Skin corrosion/irritation	Category 1A

	Serious eye damage/eye irritation	Category 1

OSHA defined hazards Not classified.

Label elements

Signal word Danger

Hazard statement Fatal if swallowed. Fatal in contact with skin. Causes severe skin burns and eye damage. Fatal if inhaled.

Precautionary statement

Prevention Do not breathe mist or vapor. Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area. Wear protective gloves/protective clothing/eye protection/face protection. Wear respiratory protection.

Response If swallowed: Rinse mouth. Do NOT induce vomiting. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. If inhaled: Remove person to fresh air and keep comfortable for breathing. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center/doctor. Wash contaminated clothing before reuse.

Storage Store in a well-ventilated place. Keep container tightly closed. Store locked up.

Disposal Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC) None known.

Supplemental information None.

3. Composition/information on ingredients

Mixtures

Chemical name	CAS number	%
Hydrofluoric acid	7664-39-3	7 - 60

Composition comments All concentrations are in percent by weight.
Components not listed are either non-hazardous or are below reportable limits.

4. First-aid measures

Inhalation Remove victim to fresh air and keep at rest in a position comfortable for breathing. Oxygen or artificial respiration if needed. Do not use mouth-to-mouth method if victim inhaled the substance. Induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Call a physician or poison control center immediately. Following inhalation exposure, a 2.5% calcium gluconate solution can be given by nebulizer.

Skin contact Immediately remove contaminated clothing, and any extraneous chemical, if possible to do so without delay. Initiate and maintain gentle and continuous irrigation until the patient receives medical care. If medical care is not promptly available, continue to irrigate for one hour. Cover wound with sterile dressing. A physician should be consulted for all exposures. Burns covering an area greater than fifty-two square centimeters (8 square inches) require immediate treatment by a medical doctor. Remove contaminated clothing. With gloved hand apply 2.5% calcium gluconate gel to the burn area.

Eye contact Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a physician or poison control center immediately. A 1.0% calcium gluconate gel solution can be used to irrigate the eye using a syringe or a continuous irrigation device.

Ingestion Call a physician or poison control center immediately. Rinse mouth. Never give anything by mouth to a victim who is unconscious or is having convulsions. Do not induce vomiting. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs. Do not use mouth-to-mouth method if victim ingested the substance. Induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Administer several vials of 10% aqueous calcium gluconate orally. (Calcium carbonate or an antacid containing calcium carbonate or magnesium carbonate or hydroxide may also be used.)

Most important symptoms/effects, acute and delayed	Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. Causes digestive tract burns. May be fatal if inhaled, absorbed through skin, or swallowed.
Indication of immediate medical attention and special treatment needed	Provide general supportive measures and treat symptomatically. Chemical burns: Flush with water immediately. While flushing, remove clothes which do not adhere to affected area. Call an ambulance. Continue flushing during transport to hospital. Keep victim warm. Keep victim under observation. Treatment : This advice is provided to the attending physician because of the specific properties of hydrogen fluoride and hydrofluoric acid. All cases of ingestion and airway exposure, and skin burns with hydrofluoric acid >20% should be regarded as potentially fatal. Patients who have burns and pain within minutes of exposure can be assumed to have been exposed to concentrated acid and are at risk of rapid clinical deterioration and death. Burns can be accompanied by absorption of fluoride through the skin with sequestration of circulating calcium leading to hypocalcemia and hyperkalemia from the release of cell contents. Fatal cardiac dysrhythmias may ensue. A person who has HF burns greater than 25 square inches or who has been burned with concentrated HF should be admitted immediately to an intensive care unit and carefully monitored by EKG for 24 to 48 hours. Blood sampling should be taken to monitor circulating fluoride, potassium and calcium levels. Hemodialysis may be necessary for fluoride removal and correction of hyperkalemia. HF inhaled in high concentrations may cause acute inflammation and edema of the airway and acute pulmonary edema. Anyone who has been exposed to HF gas or mists and experiences respiratory irritation should be admitted to and monitored in an intensive care unit. In some cases, if the eyes are exposed to HF, it may penetrate to internal structures resulting in irreversible damage. HF skin burns are usually accompanied by severe, throbbing pain, which is thought to be due to irritation of nerve endings by increased levels of potassium ions entering the extracellular space to compensate for the reduced levels of calcium ions, which have been bound to the fluoride. RELIEF OF PAIN IS AN IMPORTANT GUIDE TO THE SUCCESS OF TREATMENT.
General information	Take off immediately all contaminated clothing. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance. Discard any shoes or clothing items that cannot be decontaminated.

5. Fire-fighting measures

Suitable extinguishing media	Use fire-extinguishing media appropriate for surrounding materials.
Unsuitable extinguishing media	High pressure water streams.
Specific hazards arising from the chemical	During fire, gases hazardous to health may be formed. Contact with metals may evolve flammable hydrogen gas. Combustion products may include: hydrogen fluoride, fluorine.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire fighting equipment/instructions	Move containers from fire area if you can do so without risk. Dike fire control water for later disposal.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General fire hazards	By heating and fire, toxic and corrosive vapors/gases may be formed.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Wear appropriate protective equipment and clothing during clean-up. Do not breathe mist or vapor. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.

Methods and materials for containment and cleaning up

Clean up all spills immediately. Porous materials can absorb Hydrofluoric acid and slowly release it over time. Product can react with silica based materials (for example, glass, concrete, sand, vermiculite, and others) to generate highly toxic silicon tetrafluoride gas. Use only absorbents designated and approved for response to spills of Hydrofluoric acid. If suitable absorbents are unavailable, treat the spill with an excess of dilute, aqueous calcium or magnesium hydroxide. Do not neutralize Hydrofluoric acid with sodium or potassium carbonates or hydroxides. These chemicals react to form toxic intermediates, or generate excessive heat of reaction.

Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Apply anhydrous magnesium sulfate to the spill area. Use polypropylene spill control pads or other inert absorbent materials to soak up the spill. Do not use silica based absorbents (such as sand and vermiculite). Collect absorbent in plastic containers. Add soda ash or magnesium oxide and slaked lime to the containers. Wash the spill site with a solution of sodium carbonate ("soda ash"). Collect all waste for proper disposal. Following product recovery, flush area with water.

Small Spills: Neutralize with commercial neutralizer or sodium bicarbonate, and absorb with spill pads or other absorbent. Clean surface thoroughly to remove residual contamination.

Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.

Environmental precautions

Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling

Do not get in eyes, on skin, or on clothing. Do not taste or swallow. Avoid prolonged exposure. When using, do not eat, drink or smoke. Use only outdoors or in a well-ventilated area. Wear appropriate personal protective equipment. Wash hands thoroughly after handling. Wash contaminated clothing before reuse. Observe good industrial hygiene practices.

Conditions for safe storage, including any incompatibilities

Store locked up. Store in tightly closed container. Store in a well-ventilated place. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value
Hydrofluoric Acid (CAS 7664-39-3)	PEL	2.5 mg/m3

US. OSHA Table Z-2 (29 CFR 1910.1000)

Components	Type	Value
Hydrofluoric Acid (CAS 7664-39-3)	TWA	3 ppm

US. ACGIH Threshold Limit Values

Components	Type	Value
Hydrofluoric Acid (CAS 7664-39-3)	Ceiling	2 ppm
	TWA	0.5 ppm

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
Hydrofluoric Acid (CAS 7664-39-3)	Ceiling	5 mg/m3
		6 ppm
	TWA	2.5 mg/m3
		3 ppm

Biological limit values

ACGIH Biological Exposure Indices

Components	Value	Determinant	Specimen	Sampling Time
Hydrofluoric Acid (CAS 7664-39-3)	3 mg/l	Fluoride	Urine	*
	2 mg/l	Fluoride	Urine	*

* - For sampling details, please see the source document.

Exposure guidelines

US - California OELs: Skin designation

Hydrofluoric acid (CAS 7664-39-3)	Can be absorbed through the skin.

US ACGIH Threshold Limit Values: Skin designation

Hydrofluoric acid (CAS 7664-39-3)	Danger of cutaneous absorption

Appropriate engineering controls Good general ventilation should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Eye wash facilities and emergency shower must be available when handling this product.

Individual protection measures, such as personal protective equipment

Eye/face protection When working with liquids wear splash-proof chemical goggles and face shield unless full facepiece respiratory protection is worn.

Skin protection

Hand protection Wear appropriate chemical resistant gloves. Suitable gloves can be recommended by the glove supplier. Recommended use: Full contact: Glove material: Neoprene rubber, butyl rubber, laminate film. Use gloves with breakthrough time of >480 minutes. Minimum glove thickness 0.75, 0.68, 0.3 mm.

Skin protection

Other Wear appropriate chemical resistant clothing. Use of an impervious apron is recommended.

Respiratory protection When workers are facing concentrations above the exposure limit they must use appropriate certified respirators. Wear NIOSH approved respirator appropriate for airborne exposure at the point of use. Appropriate respirator selection should be made by a qualified professional. Recommended for lower HF concentrations: Wear NIOSH approved full facepiece respirator with filter type HF or equivalent protection. Recommended for higher HF concentrations: Supplied-air respirator with a full facepiece that is operated in a pressure-demand or other supplied air mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode.

Thermal hazards Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations Keep away from food and drink. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance

Physical state	Liquid.
Form	Clear liquid.
Color	Colorless.
Odor	Pungent.
Odor threshold	Not available.
pH	< 2
Melting point/freezing point	-118.35 °F (-83.53 °C)
Initial boiling point and boiling range	226.4 °F (108 °C)
Flash point	Not available.
Evaporation rate	Not available.
Flammability (solid, gas)	Not applicable.

Upper/lower flammability or explosive limits

Flammability limit - lower (%)	Not available.
Flammability limit - upper (%)	Not available.
Vapor pressure	10.02 mmHg
Vapor density	0.7 (Air = 1)
Relative density	Not available.

Solubility(ies)

Solubility (water)	Completely soluble
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	Not available.
Decomposition temperature	Not available.
Viscosity	Not available.

Other information

Density	1.15 g/cm³
Explosive properties	Not explosive.
Oxidizing properties	Not oxidizing.

10. Stability and reactivity

Reactivity	May be corrosive to metals.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	Product can react with silica based materials (for example, glass, concrete, sand, vermiculite, and others) to generate highly toxic silicon tetrafluoride gas. May react with some metals to form hydrogen gas.
Conditions to avoid	High temperatures. Contact with incompatible materials.
Incompatible materials	Strong oxidizing agents. Strong alkalis. Metals. Glass. Cyanides. Sulfides.
Hazardous decomposition products	Irritating and/or toxic fumes and gases may be emitted upon the product's decomposition. Thermal decomposition can produce hydrogen fluoride.

11. Toxicological information

Information on likely routes of exposure

Inhalation	Fatal if inhaled. Vapors or mists may be very irritating or corrosive to the respiratory system.
Skin contact	Fatal in contact with skin. Causes severe skin burns.
Eye contact	Causes serious eye damage.
Ingestion	Fatal if swallowed. Causes digestive tract burns.
Symptoms related to the physical, chemical and toxicological characteristics	Burning pain and severe corrosive skin damage. Causes serious eye damage. Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Permanent eye damage including blindness could result. Causes digestive tract burns. May be fatal if inhaled, absorbed through skin, or swallowed.

Information on toxicological effects

Acute toxicity Fatal if swallowed, in contact with skin, or if inhaled.

Components	Species	Test Results
Hydrofluoric acid (CAS 7664-39-3)		
Acute		
Inhalation		
LC50	Rat	4970 ppm, 5 Minutes
		2689 ppm, 15 Minutes

Skin corrosion/irritation	Causes severe skin burns.
Serious eye damage/eye irritation	Causes serious eye damage.

Respiratory or skin sensitization

Respiratory sensitization	Not a respiratory sensitizer.
Skin sensitization	This product is not expected to cause skin sensitization.
Germ cell mutagenicity	No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.
Carcinogenicity	Not classifiable as to carcinogenicity to humans.

IARC Monographs. Overall Evaluation of Carcinogenicity

Hydrofluoric acid (CAS 7664-39-3) 3 Not classifiable as to carcinogenicity to humans.

NTP Report on Carcinogens

Not listed.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not listed.

Reproductive toxicity This product is not expected to cause reproductive or developmental effects.

Specific target organ toxicity - single exposure Not classified.

Specific target organ toxicity - repeated exposure Not classified.

Aspiration hazard Does not meet classification criteria.

Chronic effects Significant exposure to hydrofluoric acid can deplete calcium levels in the body if not promptly treated, resulting in death due to hypocalcaemia. Prolonged or repeated breathing of vapors can result in liver, kidney and lung damage and possibly death. Symptoms may be delayed.

Further information Absorbed fluoride can cause metabolic imbalances with irregular heartbeat, nausea, dizziness, vomiting and seizures. Prolonged overexposure to fluorides may increase fluoride content of bones and teeth, and may result in fluorosis, and brittleness of bones. Erosion of exposed teeth. Risk of hypocalcemia with nervous problems (tetany) and cardiac arrhythmia.

12. Ecological information

Ecotoxicity The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

Product		Species	Test Results
Hydrofluoric Acid (CAS N/A)			
Aquatic			
Acute			
Algae	LC50	Freshwater algae	43 mg/l
		Marine water algae	81 mg/l
Invertebrate	LC50	Freshwater invertebrate	26 mg/l
		Marine water invertebrate	10.5 mg/l
Chronic			
Algae	NOEC	Freshwater algae	50 mg/l
Invertebrate	NOEC	Freshwater invertebrate	8.9 mg/l

Persistence and degradability The product solely consists of inorganic compounds which are not biodegradable.

Bioaccumulative potential No data available.

Mobility in soil This product is water soluble and may disperse in soil.

Other adverse effects The product may affect the acidity (pH-factor) in water with risk of harmful effects to aquatic organisms. This product contains one or more substances identified as hazardous air pollutants (HAPs) per the US Federal Clean Air Act (see section 15).

13. Disposal considerations

Disposal instructions Collect and reclaim or dispose in sealed containers at licensed waste disposal site. Incinerate the material under controlled conditions in an approved incinerator. Dispose of contents/container in accordance with local/regional/national/international regulations.

Local disposal regulations Dispose in accordance with all applicable regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner.

Hazardous waste code The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

Contaminated packaging Since emptied containers may retain product residue, follow label warnings even after container is emptied. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport information

DOT

UN number UN1790

UN proper shipping name	Hydrofluoric acid
Transport hazard class(es)	
Class	8
Subsidiary risk	6.1
Label(s)	8, 6.1
Packing group	II
Environmental hazards	
Marine pollutant	No
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Special provisions	A6, A7, B15, IB2, N5, N34, T8, TP2, TP12
Packaging exceptions	154
Packaging non bulk	202
Packaging bulk	243
ERG number	157

IATA

UN number	UN1790
UN proper shipping name	Hydrofluoric acid
Transport hazard class(es)	
Class	8
Subsidiary risk	6.1
Packing group	II
Environmental hazards	No
ERG Code	8P
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

IMDG

UN number	UN1790
UN proper shipping name	HYDROFLUORIC ACID
Transport hazard class(es)	
Class	8
Subsidiary risk	6.1
Packing group	II
Environmental hazards	
Marine pollutant	No
EmS	F-A, S-B
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not established.

15. Regulatory information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Hydrofluoric acid (CAS 7664-39-3) Listed.

SARA 304 Emergency release notification

HYDROFLUORIC ACID (CAS 7664-39-3) 100 LBS

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not listed.

Toxic Substances Control Act (TSCA) All components of the mixture on the TSCA 8(b) inventory are designated “active”.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

SARA 302 Extremely hazardous substance

Chemical name	CAS number	Reportable quantity (pounds)	Threshold planning quantity (pounds)	Threshold planning quantity, lower value (pounds)	Threshold planning quantity, upper value (pounds)
Hydrofluoric acid	7664-39-3	100	100		

SARA 311/312 Hazardous chemical Yes

Classified hazard categories
Acute toxicity (any route of exposure)
Skin corrosion or irritation
Serious eye damage or eye irritation

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
Hydrofluoric acid	7664-39-3	7 - 60

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Hydrofluoric acid (CAS 7664-39-3)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Hydrofluoric acid (CAS 7664-39-3)

Clean Water Act (CWA) Section 112(r) (40 CFR 68.130) Hazardous substance

Safe Drinking Water Act (SDWA) Contains component(s) regulated under the Safe Drinking Water Act.

US state regulations

US. Massachusetts RTK - Substance List

Hydrofluoric acid (CAS 7664-39-3)

US. New Jersey Worker and Community Right-to-Know Act

Hydrofluoric acid (CAS 7664-39-3)

US. Pennsylvania Worker and Community Right-to-Know Law

Hydrofluoric acid (CAS 7664-39-3)

US. Rhode Island RTK

Hydrofluoric acid (CAS 7664-39-3)

California Proposition 65

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): This material is not known to contain any chemicals currently listed as carcinogens or reproductive toxins. For more information go to www.P65Warnings.ca.gov.

US. California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3, subd. (a))

Hydrofluoric acid (CAS 7664-39-3)

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
Taiwan	Taiwan Chemical Substance Inventory (TCSI)	Yes

Country(s) or region	Inventory name	On inventory (yes/no)*
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date 18-August-2020

Revision date 17-December-2020

Version # 02

NFPA ratings

Disclaimer CMC Materials cannot anticipate all conditions under which this information and its product, or the products of other manufacturers in combination with its product, may be used. It is the user's responsibility to ensure safe conditions for handling, storage and disposal of the product, and to assume liability for loss, injury, damage or expense due to improper use. The information in the sheet was written based on the best knowledge and experience currently available.