Safety Data Sheet

Prepared in Accordance with HCS 29 C.F.R. 1910.1200

1. Identification of the Substance/Mixture and the Company/Undertaking

1.1 Product Identifier 1155A1NL

Product Name: THERMALINE 440 PART A

Revision Date: 12/05/2022

Supercedes Date: 07/13/2020

1.2 Relevant identified uses of the substance or mixture and uses advised against Component of multicomponent industrial coatings - Industrial use.

1.3 Details of the supplier of the safety data sheet

Manufacturer:

Carboline Global Inc.
2150 Schuetz Road
St. Louis, MO USA 63146

Regulatory / Technical Information:
Contact Carboline Technical Services at
1-800-848-4645

Datasheet Produced by: Schlereth, Ken - regulatory@carboline.com

1.4 Emergency telephone number:

CHEMTREC 1-800-424-9300 (Inside US)
CHEMTREC +1 703 5273887 (Outside US)
HEALTH - Pittsburgh Poison Control 1-412-681-6669

2. Hazard Identification

2.1 Classification of the substance or mixture

Acute Toxicity, Inhalation, category 4
Hazardous to the aquatic environment, Chronic, category 3
Carcinogenicity, category 1A
Eye Irritation, category 2
Flammable Liquid, category 2
STOT, single exposure, category 3, RTI
Skin Irritation, category 2
Skin Sensitizer, category 1

2.2 Label elements

Symbol(s) of Product

Signal Word

Danger

Named Chemicals on Label

ORTHO-XYLENE, ETHYL BENZENE, PARA-XYLENE, METHYL ISOBUTYL KETONE, META-XYLENE, EPOXY PHENOL NOVOLAC RESIN, MICA, MICROCRYSTALLINE SILICA, EPOXY RESIN, BISPHENOL A EPOXY RESIN

HAZARD STATEMENTS

Flammable Liquid, category 2	H225	Highly flammable liquid and vapour.
Skin Irritation, category 2	H315	Causes skin irritation.
Skin Sensitizer, category 1	H317	May cause an allergic skin reaction.
Eye Irritation, category 2	H319	Causes serious eye irritation.
Acute Toxicity, Inhalation, category 4	H332	Harmful if inhaled.
STOT, single exposure, category 3, RTI	H335	May cause respiratory irritation.
Carcinogenicity, category 1A	H350-1A	May cause cancer.
Hazardous to the aquatic environment, Chronic, category 3	H412	Harmful to aquatic life with long lasting effects.

PRECAUTION PHRASES

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P210	Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P235	Keep cool.
P261	Avoid breathing dust/fume/gas/mist/vapours/spray.
P273	Avoid release to the environment.
P280	Wear protective gloves/protective clothing/eye protection/ face protection.
P284	Wear respiratory protection.
P302+352	IF ON SKIN: Wash with plenty of soap and water.
P304+340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305+351+338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do so. Continue rinsing.
P308+313	IF exposed or concerned: Get medical advice/attention
P333+313	If skin irritation or rash occurs: Get medical advice/attention.
P403+233	Store in a well-ventilated place. Keep container tightly closed.

2.3 Other hazards

No Information

Results of PBT and vPvB assessment:

The product does not meet the criteria for PBT/VPvB in accordance with Annex XIII.

3. Composition/Information On Ingredients

3.2 Mixtures

Hazardous ingredients

Name According to EEC	EINEC No.	CAS-No.	%	Classifications	
EPOXY RESIN	607-500-3	25036-25-3	25 - <50	H315-317-319	
MICA	310-127-6	12001-26-2	10 - <25	H319-335	Eye Irrit. 2, STOT SE 3 RTI
TALC	238-877-9	14807-96-6	10 - <25		
TITANIUM DIOXIDE	236-675-5	13463-67-7	10 - <25		
META-XYLENE	203-576-3	108-38-3	10 - <25	H312-315-332	
BISPHENOL A EPOXY RESIN	500-033-5	25068-38-6	2.5 - <10	H315-317-319-411	Aquatic Chronic 2, Eye Irrit. 2, Skin Irrit. 2, Skin Sens. 1
PARA-XYLENE	203-396-5	106-42-3	2.5 - <10	H304-312-315-332-335-371	
ETHYL BENZENE	202-849-4	100-41-4	2.5 - <10	H225-304-315-319-332-351-373-412	Acute Tox. 4 Inhalation, Aquatic Chronic 3, Asp. Tox. 1, Carc. 2, Eye Irrit. 2, Flam. Liq. 2, Skin Irrit. 2, STOT RE 2
ORTHO-XYLENE	202-422-2	95-47-6	2.5 - <10	H312-315-332	
METHYL ISOBUTYL KETONE	203-550-1	108-10-1	2.5 - <10	H225-302-312-319-332-335	Acute Tox. 4 Dermal, Acute Tox. 4 Inhalation, Acute Tox. 4 Oral, Eye Irrit. 2, Flam. Liq. 2, STOT SE 3 RTI
EPOXY PHENOL NOVOLAC RESIN	701-263-0	9003-36-5	1.0 - <2.5	H315-317-411	Aquatic Chronic 2, Skin Irrit. 2, Skin Sens. 1
MICROCRYSTALLINE SILICA	238-878-4	14808-60-7	0.1 - <1.0	H350-372	Carc. 1A, STOT RE 1
TOLUENE	203-625-9	108-88-3	0.1 - <1.0	H225-304-315-319-332-335-336-361-370-412	Acute Tox. 4 Inhalation, Aquatic Chronic 3, Asp. Tox. 1, Eye Irrit. 2, Flam. Liq. 2, Repr. 2, Skin Irrit. 2, STOT SE 1, STOT SE 3 NE, STOT SE 3 RTI

CAS-No.	M-Factors
25036-25-3	0
12001-26-2	0
14807-96-6	0
13463-67-7	0
108-38-3	0
25068-38-6	0
106-42-3	0
100-41-4	0
95-47-6	0
108-10-1	0
9003-36-5	0
14808-60-7	0
108-88-3	0

Remarks: CAS No 13463-67-7: Note 10
CAS No. 25068-38-6 identified as CAS No. 1675-54-3, EC No. 216-823-5 under REACH Registration

Additional Information: The text for GHS Hazard Statements shown above (if any) is given in Section 16.

4. First-aid Measures

4.1 Description of First Aid Measures

AFTER INHALATION: Give oxygen or artificial respiration if needed. Remove person to fresh air. If signs/symptoms continue, get medical attention.
AFTER SKIN CONTACT: In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. If skin irritation persists, call a physician.
AFTER EYE CONTACT: Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.
AFTER INGESTION: Do NOT induce vomiting. Never give anything by mouth to an unconscious person. If swallowed, call a poison control centre or doctor immediately.

4.2 Most important symptoms and effects, both acute and delayed

Harmful if swallowed. Irritating to eyes and skin. Risk of serious damage to the lungs (by aspiration). Vapours may cause drowsiness and dizziness.

4.3 Indication of any immediate medical attention and special treatment needed

No information available on clinical testing and medical monitoring. Specific toxicological information on substances, if available, can be found in section 11.
When symptoms persist or in all cases of doubt seek medical advice.

5. Fire-fighting Measures

5.1 Extinguishing Media:

Carbon Dioxide, Dry Chemical, Foam, Water Fog

UNUSUAL FIRE AND EXPLOSION HAZARDS: Flammable liquid. Vapours are heavier than air and may spread along floors. Vapours may form explosive mixtures with air. Vapors may travel to areas away from work site before igniting/flashing back to vapor source. Provide adequate ventilation. Prevent the creation of flammable or explosive concentrations of vapour in air and avoid vapour concentration higher than the occupational exposure limits. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Electrical installations / working materials must comply with the technological safety standards. Wear shoes with conductive soles.

FOR SAFETY REASONS NOT TO BE USED: No Information

5.2 Special hazards arising from the substance or mixture

No Information

5.3 Advice for firefighters

SPECIAL FIREFIGHTING PROCEDURES: In the event of fire, wear self-contained breathing apparatus. Cool containers / tanks with water spray. Flammable.

SPECIAL FIREFIGHTING PROTECTION EQUIPMENT: No Information

6. Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures

Ensure adequate ventilation. Evacuate personnel to safe areas. Remove all sources of ignition. To avoid ignition of vapours by static electricity discharge, all metal parts of the equipment must be grounded. Wear personal protective equipment. For personal protection see section 8.

6.2 Environmental precautions

Do not allow material to contaminate ground water system. Prevent product from entering drains.

6.3 Methods and material for containment and cleaning up

Prevent further leakage or spillage if safe to do so. Contain spillage, soak up with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and transfer to a container for disposal according to local / national regulations (see section 13).

6.4 Reference to other sections

No Information

7. Handling and Storage

7.1 Precautions for safe handling

INSTRUCTIONS FOR SAFE HANDLING : Keep containers dry and tightly closed to avoid moisture absorption and contamination. Prepare the working solution as given on the label(s) and/or the user instructions. Do not breathe vapours or spray mist. Ensure all equipment is electrically grounded before beginning transfer operations. Do not use sparking tools. Do not get in eyes, on skin, or on clothing. Use only with adequate ventilation/personal protection. Wash thoroughly after handling.
PROTECTION AND HYGIENE MEASURES : Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday. When using, do not eat, drink or smoke.

7.2 Conditions for safe storage, including any incompatibilities

CONDITIONS TO AVOID: Heat, flames and sparks.
STORAGE CONDITIONS: Keep container closed when not in use. Store in a dry, well ventilated place away from sources of heat, ignition and direct sunlight.

7.3 Specific end use(s)

No specific advice for end use available.

8. Exposure Controls/Personal Protection

8.1 Control parameters

Ingredients with Occupational Exposure Limits (US)

Name	CAS-No.	ACGIH TWA	ACGIH STEL	ACGIH Ceiling
EPOXY RESIN	25036-25-3	N/E	N/E	N/E
MICA	12001-26-2	3 MGM3	N/E	N/E
TALC	14807-96-6	2 MGM3	N/E	N/E
TITANIUM DIOXIDE	13463-67-7	10 mg/m3	N/E	N/E
META-XYLENE	108-38-3	100 PPM	150 PPM	N/E
BISPHENOL A EPOXY RESIN	25068-38-6	N/E	N/E	N/E
PARA-XYLENE	106-42-3	100 PPM	150 PPM	N/E
ETHYL BENZENE	100-41-4	20 PPM	125 ppm	
ORTHO-XYLENE	95-47-6	100 PPM	150 PPM	N/E
METHYL ISOBUTYL KETONE	108-10-1	20 PPM	75 PPM	N/E
EPOXY PHENOL NOVOLAC RESIN	9003-36-5	N/E	N/E	N/E
MICROCRYSTALLINE SILICA	14808-60-7	0.025 MGM3	N/E	N/E
TOLUENE	108-88-3	20 PPM	N/E	N/E

Name	CAS-No.	OSHA PEL	OSHA STEL
EPOXY RESIN	25036-25-3	N/E	N/E
MICA	12001-26-2	20. MPPCF	N/E
TALC	14807-96-6	0.1 MGM3	N/E
TITANIUM DIOXIDE	13463-67-7	15 MGM3	N/E
META-XYLENE	108-38-3	100.00 PPM	N/E
BISPHENOL A EPOXY RESIN	25068-38-6	N/E	N/E
PARA-XYLENE	106-42-3	100.00 PPM	N/E

ETHYL BENZENE	100-41-4	435 MGM3, 100 PPM	545 MGM3, 125 PPM
ORTHO-XYLENE	95-47-6	100.00 PPM	N/E
METHYL ISOBUTYL KETONE	108-10-1	205 MGM3, 50 PPM	300 MGM3, 75 PPM
EPOXY PHENOL NOVOLAC RESIN	9003-36-5	N/E	N/E
MICROCRYSTALLINE SILICA	14808-60-7	0.05 MGM3	N/E
TOLUENE	108-88-3	200 ppm	560 MGM3, 150 PPM

FURTHER ADVICE: Refer to the regulatory exposure limits for the workforce enforced in each country. Some components may not have been classified under the EU CLP Regulation.

8.2 Exposure controls

Personal Protection

RESPIRATORY PROTECTION: In order to avoid inhalation of spray-mist and sanding dust, all spraying and sanding must be done wearing adequate respirator. Use only with ventilation to keep levels below exposure guidelines reported in this document. User should test and monitor exposure levels to ensure all personnel are below guidelines. If not sure, or not able to monitor, use State or federally approved supplied air respirator. For silica containing coatings in a liquid state, and/or if no exposure limits are established above, air-supplied respirators are generally not required.

EYE PROTECTION: Safety glasses with side-shields.

HAND PROTECTION: Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough. Impervious gloves. Request information on glove permeation properties from the glove supplier. Lightweight protective clothing

OTHER PROTECTIVE EQUIPMENT: Ensure that eyewash stations and safety showers are close to the workstation location.

ENGINEERING CONTROLS: Avoid contact with skin, eyes and clothing. Ensure adequate ventilation, especially in confined areas.

9. Physical and Chemical Properties

9.1 Information on basic physical and chemical properties

Appearance:	Viscous Liquid, Various Colors
Physical State	Liquid
Odor	Epoxy
Odor threshold	Not Determined
pH	Not Determined
Melting point / freezing point (°C)	Not Determined
Boiling point/range (°C)	176 F (80 C) - 500 F (260 C)
Flash Point (°C)	64°F (17°C)
Evaporation rate	Slower Than Ether
Flammability (solid, gas)	N/D
Upper/lower flammability or explosive limits	1.0 - 8.0
Vapour Pressure, mmHg	Not Determined
Vapour density	Heavier than Air
Relative density	N/D
Solubility in / Miscibility with water	Not Determined

Partition coefficient: n-octanol/water	N/D
Auto-ignition temperature (°C)	N/D
Decomposition temperature (°C)	N/D
Viscosity	Not Determined
Explosive properties	N/D
Oxidising properties	N/D

9.2 Other information

VOC Content g/l:	419
Specific Gravity (g/cm3)	1.42

10. Stability and Reactivity

10.1 Reactivity
No reactivity hazards known under normal storage and use conditions.

10.2 Chemical stability
Stable under normal conditions.

10.3 Possibility of hazardous reactions
Hazardous polymerisation does not occur.

10.4 Conditions to avoid
Heat, flames and sparks.

10.5 Incompatible materials
Strong oxidizing agents.

10.6 Hazardous decomposition products
Carbon dioxide (CO2), carbon monoxide (CO), oxides of nitrogen (NOx), dense black smoke.

11. Toxicological Information

11.1 Information on toxicological effects

Acute Toxicity:

Oral LD50: N/D

Inhalation LC50: N/D

Irritation: Eye Irritation and Skin Irritation, category 2

Corrosivity: Unknown

Sensitization: Skin Sensitizer, category 1

Repeated dose toxicity: Unknown

Carcinogenicity: Carcinogenicity, category 1A

Mutagenicity: Unknown

Toxicity for reproduction: Unknown

STOT-single exposure: STOT, single exposure, category 3, RTI

STOT-repeated exposure: Unknown

Aspiration hazard: Unknown

If no information is available above under Acute Toxicity then the acute effects of this product have not been tested. Data on individual components are tabulated below:

CAS-No.	Chemical Name	Oral LD50	Dermal LD50	Vapor LC50	Gas LC50	Dust/Mist LC50
25036-25-3	EPOXY RESIN	>2000 mg/kg, oral, rat	>2000 mg/kg, dermal, rat	Not Available	0.000	0.000
12001-26-2	MICA	Not Available	Not Available	Not Available	0.000	0.000
14807-96-6	TALC	Not Available		Not Available	0.000	0.000
13463-67-7	TITANIUM DIOXIDE	25000 mg/kg, oral (rat)	Not Available	Not Available	No Information	No Information
108-38-3	META-XYLENE	Not Available	Not Available	Not Available	0.000	0.000
25068-38-6	BISPHENOL A EPOXY RESIN	11400 mg/kg, rat, oral	23000 mg/kg, dermal, rabbit	>20 mL/kg skin, sensitizer		
106-42-3	PARA-XYLENE	Not Available	Not Available	Not Available	0.000	0.000
100-41-4	ETHYL BENZENE	3500 mg/kg rat, oral	>5000 mg/l, dermal rabbit	17.2 mg/L Inh, Rat, 4Hr	0.000	0.000
95-47-6	ORTHO-XYLENE	Not Available	Not Available	Not Available	0.000	0.000
108-10-1	METHYL ISOBUTYL KETONE	2000 mg/kg, oral, rat	2000 mg/kg, dermal, rat	5000 ppm/ 1 hr, Inh, rat	0.000	0.000
9003-36-5	EPOXY PHENOL NOVOLAC RESIN	>5000 mg/kg, oral, rat		Not Available	0.000	0.000

14808-60-7	MICROCRYSTALLINE SILICA	22500 mg/kg	Not Available	Not Available	0.000	0.000
108-88-3	TOLUENE	5000 mg/kg rat oral	12267 mg/kg, dermal, rabbit	8000 ppm/4 hrs, rat, inhalation	0.000	0.000

Additional Information:

This product may contain Ethyl Benzene, which is listed by IARC as possibly carcinogenic to humans (Group 2B). This listing is based on inadequate evidence of carcinogenicity in humans and sufficient evidence in experimental animals. Constituents of this product may include crystalline silica which, if inhalable, may cause silicosis, a form or progressive pulmonary fibrosis. Inhalable crystalline silica is listed by IARC as a group 1 carcinogen (lung) based on sufficient evidence in occupationally exposed humans and sufficient evidence in animals. Crystalline silica is also listed by the NTP as a known human carcinogen. This classification is relevant when exposed to Quartz (silicon dioxide) in dust or powder form only, including cured product that is subject to sanding, grinding, cutting, or other surface preparation activities. Constituents may also include abestiform or non-asbestiform tremolite or other silicates as impurities, and above dei minimus exposure to these impurities in inhalable form may be carcinogenic or cause other serious lung problems.

12. Ecological Information

12.1 Toxicity:

EC50 48hr (Daphnia): No information available.

IC50 72hr (Algae): No information available.

LC50 96hr (fish): No information available.

12.2 Persistence and degradability: No information available.

12.3 Bioaccumulative potential: No information available.

12.4 Mobility in soil: No information available.

12.5 Results of PBT and vPvB assessment: The product does not meet the criteria for PBT/VPvB in accordance with Annex XIII.

12.6 Other adverse effects: No information available.

CAS-No.	Chemical Name	EC50 48hr	IC50 72hr	LC50 96hr
25036-25-3	EPOXY RESIN	No information	No information	No information
12001-26-2	MICA	No information	No information	No information
14807-96-6	TALC	No information	No information	No information
13463-67-7	TITANIUM DIOXIDE	No information	No information	No information
108-38-3	META-XYLENE	No information	No information	No information
25068-38-6	BISPHENOL A EPOXY RESIN	2.1 mg/l (daphnia)	11 mg/l (algae)	1.3 mg/l (fish)
106-42-3	PARA-XYLENE	No information	No information	No information
100-41-4	ETHYL BENZENE	1.8 mg/l (Daphnia Magna)	4.6 mg/l (Green Algae)	4.2 mg/l (Rainbow Trout)
95-47-6	ORTHO-XYLENE	No information	No information	No information
108-10-1	METHYL ISOBUTYL KETONE	200 mg/l (Daphnia magna)	No information	179 mg/l (Zebra fish)
9003-36-5	EPOXY PHENOL NOVOLAC RESIN	1.6 mg/l (Daphnia Magna)	1.8 mg/l (Green Algae)	0.55 mg/l (Rainbow Trout)
14808-60-7	MICROCRYSTALLINE SILICA	No information	No information	No information
108-88-3	TOLUENE	6 mg/l (Daphnia magna)	12.5 mg/L (Algae)	5.8 mg/L (Fish)

13. Disposal Considerations

13.1 **WASTE TREATMENT METHODS:** Do not burn, or use a cutting torch on, the empty drum. If recycling is not practicable, dispose of in compliance with local regulations. Dispose of in accordance with local regulations. Empty containers should be taken to an approved waste handling site for recycling or disposal.

14. Transport Information

14.1	**UN number**	UN1263
14.2	**UN proper shipping name**	Paint
	Technical name	N/A
14.3	**Transport hazard class(es)**	3
	Subsidiary shipping hazard	N/A
14.4	**Packing group**	II
14.5	**Environmental hazards**	Marine pollutant: Yes (Epoxy Resin)
14.6	**Special precautions for user**	No information available.
	EmS-No.:	F-E, S-E
14.7	**Transport in bulk according to Annex II of MARPOL 73/78 and the IBC code**	No information available.

15. Regulatory Information

15.1 **Safety, health and environmental regulations/legislation for the substance or mixture:**

U.S. Federal Regulations: As follows -

CERCLA - Sara Hazard Category

This product has been reviewed according to the EPA 'Hazard Categories' promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

Flammable (gases, aerosols, liquids, or solids), Carcinogenicity, Acute Toxicity (any route of exposure), Skin Corrosion or Irritation, Respiratory or Skin Sensitization, Serious eye damage or eye irritation, Specific target organ toxicity (single or repeated exposure)

Sara Section 313:

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR part 372:

Chemical Name	CAS-No.	%
META-XYLENE	108-38-3	10.43
PARA-XYLENE	106-42-3	4.54
ETHYL BENZENE	100-41-4	4.31
ORTHO-XYLENE	95-47-6	3.29
METHYL ISOBUTYL KETONE	108-10-1	3.11
TOLUENE	108-88-3	0.11

Toxic Substances Control Act:

All components of this product are either listed on the TSCA Inventory or are exempt.

This product contains the following chemical substances subject to the reporting requirements of TSCA 12(B) if exported from the United States:

No TSCA 12(b) components exist in this product.

U.S. State Regulations: As follows -

New Jersey Right-to-Know:

The following materials are non-hazardous, but are among the top five components in this product.

Chemical Name	CAS-No.
No NJ Right-To-Know components exist in this product.	

Pennsylvania Right-To-Know

The following non-hazardous ingredients are present in the product at greater than 3%.

Chemical Name	CAS-No.
IRON OXIDE	1309-37-1
1,2-BENZENEDICARBOXIOLIC ACID, DI-C9-11-BRANCHED AND LINEAR ALKYL ESTERS	68515-43-5

CALIFORNIA PROPOSITION 65

WARNING: Cancer and Reproductive Harm -- www.P65Warnings.ca.gov

International Regulations: As follows -

* Canadian DSL:

All chemical ingredients included on inventory (DSL)

15.2 Chemical Safety Assessment:

No Chemical Safety Assessment has been carried out for this substance/mixture by the supplier.

16. Other Information

Text for GHS Hazard Statements shown in Section 3 describing each ingredient:

H225	Highly flammable liquid and vapour.
H302	Harmful if swallowed.
H304	May be fatal if swallowed and enters airways.
H312	Harmful in contact with skin.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H335	May cause respiratory irritation.
H336	May cause drowsiness or dizziness.
H350	May cause cancer.
H351	Suspected of causing cancer.
H361	Suspected of damaging fertility or the unborn child.
H370	Causes damage to organs.
H371	May cause damage to organs.
H372	Causes damage to organs through prolonged or repeated exposure.
H373	May cause damage to organs through prolonged or repeated exposure.
H411	Toxic to aquatic life with long lasting effects.
H412	Harmful to aquatic life with long lasting effects.

Reasons for revision

No Information

The information contained herein is, to the best of our knowledge and belief accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by use of this material. It is the responsibility of the user to comply with all applicable federal, state, and local laws and regulations.