MATERIAL SAFETY DATA SHEET

Perchloric Acid 10% / 6th version (USA), November 15, 2011

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY

Component Name: **Perchloric Acid 10%**

Applicable Product(s): **AR176 // Artisan™ Grocott's Methenamine Silver Stain Kit**
AR376 // Artisan™ Grocott's Methenamine Silver Eosin Stain Kit

Company Identification: Dako North America, Inc., 6392 Via Real, Carpinteria, California, 93013, United States.
Tel. +805/566-6655, FAX +805/566-6688

24-Hour Emergency Contact: CHEMTREC +800/424-9300 (U.S.A. and Canada only)
+703/527-3887 (all other countries)

2. COMPOSITION/INFORMATION ON INGREDIENTS

% / Chemical Name:	CAS# / EINECS#:	Hazard Classification:
10 / Perchloric acid	7601-90-3 / 231-512-4	E: R5 O: R8 C: R35
>1 / Water	7732-18-5 / 231-791-2	None Identified

NOTE: The Hazard Classification listed in this section refers to the chemical at a pure concentration. It has been determined that the remaining ingredient(s) of this component/product are NOT CLASSIFIED AS HAZARDOUS CHEMICALS due to their physical and/or chemical nature and/or concentration in solution, in accordance with California and Federal OSHA regulations (Federal Register 29CFR 1910.1200), and The Chemicals (Hazard Information and Packaging for Supply) Regulations (European Community).

3. HAZARDS IDENTIFICATION

Physical and Chemical Hazards: Corrosive liquid.

Skin Contact: Prolonged exposure may cause burning or discoloration accompanied by pain.

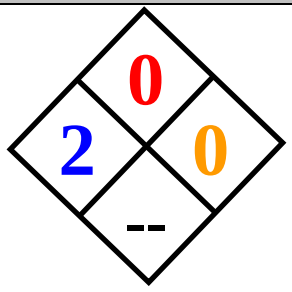
Eye Contact: May cause rapid irritation, pain, tearing, redness or corneal damage.

Inhalation: Aerosols irritate the respiratory system, and may cause coughing and difficulties in breathing.

Ingestion: Will burn any organ or surface in contact with this chemical. May cause pain, burning sensation, salivation, nausea, chills, vomiting, thirst, asphyxia or death

Environment: None identified.

4. NATIONAL FIRE PROTECTION AGENCY (NFPA) RATING



Fire Hazard / Flash Points: Non-Flammable

Health Hazard: Hazardous

Reactivity: Normally Stable

Specific Hazard: None identified

5. EMERGENCY FIRST-AID MEASURES

Skin: Remove victim to nearest source of water. Remove contaminated clothing, blot excess chemical from skin and wash affected area under lukewarm water using a mild soap. Rinse for at least 20 minutes and blot dry. Seek immediate medical attention.

Eye: Remove victim to nearest source of water, blot excess chemical from face and gently rinse affected eye(s) with clean, lukewarm water for at least 20 minutes. In order to cleanse as much of the eye as possible, be sure to wash under eyelids. If worn, have victim remove contacts. Seek medical attention. If eyes are painful or sensitive to light, protect with a clean, loosely tied handkerchief or towel. Maintain physical and verbal contact with victim.

Inhalation: Remove victim to well-ventilated area. If victim is coughing or short of breath, loosen tight fitting clothing, have victim lie down and keep warm and calm. Oxygen may be given. Seek medical attention. If simply overwhelmed, loosen tight clothing, lie victim down, monitor pulse and keep warm and calm.

Ingestion: Remove victim to well-ventilated area. Seek immediate medical attention. If face is blue or breathing is labored, lay victim on back, open and clear airway and give oxygen. Keep victim warm and calm. If unconscious, lay victim on side, loosen tight clothing, give oxygen and monitor vital signs. If conscious, give water and have victim rinse mouth. **Do not induce vomiting.** If vomiting, have victim sitting up and leaning forward.

6. FIRE-FIGHTING MEASURES

Flash Point / Explosion Information: N/A (Non-flammable) / LEL: N/A UEL: N/A

Precautions During Fire: Avoid inhalation of toxic fumes. If possible, safely move container away from fire area.

Suitable Extinguishing Media: Carbon dioxide, dry chemical or appropriate foam.

Special Exposure Hazards: If strongly heated, possible release of acid fumes. Contact with other material may cause fire. May accelerate combustion. Combustion or decomposition of material may produce hazardous and/or irritating fumes. Hazardous polymerization will not occur.

Special Protective Equipment for Firefighters: Wear self-contained breathing apparatus and protective clothing to prevent contact with eyes and skin.

7. ACCIDENTAL RELEASE MEASURES

Personal Precautions: Personal protective equipment and clothing is recommended during all cleanup procedures. Eliminate all ignition sources, stop or control leak. Fumes may require evacuation of immediate area. Refer to Section 8 for additional information on exposure controls and personal protective equipment.

Environmental Precautions: Do not allow into any body of water. Check with local and State regulations before discharging into sewers or public landfills.

Methods for Cleanup: Avoid physical contact during removal. An approved respirator is recommended when irritant or nuisance vapors are produced. Cover spill with dry lime or soda ash, and place in a closed container and hold for waste disposal. Absorbent pads or paper towels may be used for small spills of less than 1 liter. Ventilate area and wash spill site after material pickup is complete. Refer to Section 13 for complete disposal information.

8. HANDLING AND STORAGE

Keep containers tightly closed. Store reagent at 2-8 ^{o}C in a location protected from light. Keep out of reach of children.

- **NEVER HEAT SOLUTIONS CONTAINING PERCHLORIC ACID WITHOUT PROPER TRAINING. Perchloric acid becomes a strong oxidizer when heated. Organic, metallic and non-organic salts formed from oxidation are shock sensitive and pose a great fire and explosion hazard.**

9. EXPOSURE CONTROLS / PERSONAL PROTECTION

Permissible Exposure Limit (OSHA TWA/TLV/STEL): Perchloric acid: None identified.

Precautionary Measures During Use: Avoid physical contact and prolonged or repeated exposures. A chemical fume hood is highly recommended. Do not breathe vapors if produced. Do not get in eyes, on skin, or on clothing. Wash thoroughly after handling. Mechanical exhaust is required.

Inhalation: Respiratory protection is highly recommended if irritating vapors are produced during routine usage of this product. Though it is not likely, if TWA or other exposure limits are exceeded during the usage of this material, attempt to reduce exposure levels to within an acceptable range. If this is not possible, use a NIOSH/MSHA-Approved respirator. Follow NIOSH/MSHA and equipment manufacturer's recommendations to determine appropriate equipment choice. Chemicals without established limits must also be considered when determining respiratory protection protocols.

Skin: Use chemically resistant gloves (e.g. nitrile), lab coat with sleeves or rubber apron. Be aware that over time, the liquid may penetrate the gloves. Frequent change is advisable. Some glove types may not be compatible for use with this component. Other types of gloves can be recommended by the glove supplier.

Eye: Splash-proof chemical safety goggles or face shield.

Other: Eye wash or safety shower.

Environmental Exposure Controls: Not available.

10. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Clear, colorless liquid
Odor: None
pH (as supplied): N/A
Boiling Point/Boiling Range: N/A
Melting Point/Melting Range: N/A
Flammability (liquid): NON-FLAMMABLE
% Volatiles by Volume: N/A
Autoflammability: N/A
Oxidizing Properties: N/A
Vapor Pressure (kPa): N/A
Relative Density (gm/mL @ 20ºC): N/A
Water Solubility: Soluble
Alcohol or Glycerol Solubility: N/A
Evaporation Rate: N/A

11. STABILITY AND REACTIVITY

Stability: Stable when used appropriately.

Conditions to Avoid: Contact with heat in excess of 160ºC.

Materials to Avoid: Organics, cyanides, sulfides, sulfites and finely powdered metals.

Hazardous Decomposition Products: None identified.

12. TOXICOLOGICAL INFORMATION (dangerous-to-health effects)

Perchloric acid: **Corrosive.** Orl-rat LD_{50} = 1100 mg/kg. Scu-mus LD_{50} = 250 mg/kg. Orl-dog LD_{50} = 400 mg/kg. Target organ(s): None identified.

NOTE: To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated at product concentrations.

13. ECOLOGICAL INFORMATION

Mobility: This product/component is water soluble and may spread in water systems.

Degradability: This product consists mainly of inorganic compounds, which are not biodegradable.

Accumulation: No information available.

Ecotoxicity: No information available.

Other Hazardous Effects: None identified.

14. DISPOSAL CONSIDERATIONS

Waste Management Information (Disposal): When disposing of the unused contents, the preferred options are to send to a licensed reclaimer, or permitted incinerators. Any disposal practice must be in compliance with local, State, and Federal laws and regulations. Check with local and State regulations before discharging into sewers or public landfills. Do not dump into any body of water.

15. TRANSPORT INFORMATION

IATA Classification: Corrosive / oxidizer liquid.
Proper Shipping Name: Perchloric acid solution, 10%
Hazard Class#: 8 / 5.1 (sub risk) **Packing Group# / PI#:** II / 813
ADR/RID: N/A **UN#:** 1802

16. REGULATORY INFORMATION / LABELING

Contains: 10% Perchloric acid

R-and S-phrases:

R34 : Causes burns.

S26 : In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

S36/37/39 : Wear suitable protective clothing, gloves and eye/face protection.

S45 : In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

S60 : This material and/or its container must be disposed of as hazardous waste.

: As a general rule, persons under 18 years of age are not allowed to work with this product. Users must be carefully instructed in the proper procedure, the dangerous properties of the product and the necessary safety instructions.

Hazard symbol(s):

Corrosive (C)

16. REGULATORY INFORMATION / LABELING (con't)

Restrictions on Use: The product is for laboratory use only. The product must not be handled by persons under 18 years of age.

Training Provisions: The product should be handled only by technically qualified individuals experienced in handling potentially hazardous chemicals. The content of this Material Safety Data Sheet should also be known before use.

OSHA Status: In accordance with the OSHA Hazard Communication Standard, at product concentrations, the chemical components listed on this Material Safety Data Sheet are classified as hazardous.

Toxic Substances Control Act (TSCA): This product complies with all TSCA inventory requirements.

California Proposition 65: The following statement is made in order to comply with the California State Drinking Water and Toxic Enforcement Act of 1986. **This product does NOT contain chemicals on California's listing of known or suspected carcinogens.**

Applicable Compliance Standards: This Material Safety Data Sheet is in compliance with the Federal Occupational Safety and Health Administration's Hazard Communication Standard [29 CFR 1910.1200 ET. SEQ.], and The Chemicals (Hazard Information and Packaging for Supply) Regulations 1994 (European Community).

17. OTHER INFORMATION

Wording of Risk Phrases:

R5 Heating may cause an explosion.
R8 Contact with combustible material may cause fire.
R34 Causes burns.
R35 Causes severe burns.

User Note: The information in this Material Safety Data Sheet was obtained from sources which we believe are reliable. However, the information is provided without any representation or warranty, express or implied, regarding its accuracy or correctness. Although certain hazards are described herein, we cannot state that these are the only hazards which exist. Final determination of suitability and safe usage of this product is the sole responsibility of the user who is obligated to review this data in the specific context of the intended use and determine applicability.

Use of Abbreviations: The terms "Not Available" and "Not Relevant" shall be designated by the text "N/A" for "Not Available" and "N/R" for "Not Relevant".

Trade Secret Provision and Chemical Concentration Disclosure: In accordance with OSHA and European Union regulations (20 CFR 1910.1200i and 1999/45/EC), specific chemical identities may be withheld provided all required provisions of the regulation are met. Chemical concentrations may be disclosed as either a specific value or range, provided the range given is applicable to the hazards as identified by the MSDS.

Hazard Symbol Key: C: Corrosive / E: Explosive / F: Highly Flammable / F+: Extremely Flammable / N: Dangerous for the Environment / O: Oxidizing / T: Toxic / T+: Very Toxic / Xi: Irritant / Xn: Harmful

Sources of Key Data: Material Safety Data Sheets from suppliers, the Sigma-Aldrich Library of Chemical Safety, Merck Index, Sax's Dangerous Properties of Industrial Materials, American Conference of Government Industrial Hygienists – 2002, and North American Emergency Response Guidebook. The Chemicals (Hazard Information and Packaging for Supply) Regulations 2002. No. 1689. Commission Directive 91/155/EEC as amended by Commission Directive 2001/58/EC (Safety Data Sheets) in accordance with Parliament and Council Directive 1999/45/EC and Council Directive 67/548/EEC. Additional chemical information and hazard classification data provided by the Danish Toxicology Centre.

Revision date: November 15, 2011
Replaces 5th version of September 1, 2008. This MSDS has been specifically updated to reflect current product formulations and hazard information. All MSDS's generated before the revision date should be discarded.