



## **Chemical Compatibility and Impact Analysis of HYTREAT 1200 and HYTREAT 5300**

### **Potential Reactions**

#### **1. Uncontrolled Chemical Reactions**

Mixing HYTREAT 1200 with HYTREAT 5300 may result in uncontrolled chemical reactions due to the incompatibility of their chemical properties. HYTREAT 5300 contains strong acidic components, while HYTREAT 1200 contains isothiazolinone-based biocides that are known to be unstable under highly acidic conditions. Direct contact between these concentrated chemicals can trigger rapid degradation reactions, potentially accompanied by heat release, changes in color, or formation of by-products. Such uncontrolled reactions are difficult to predict and manage, increasing the likelihood of unsafe conditions during handling, storage, or dosing operations.

#### **2. Loss of Product Effectiveness**

The chemical incompatibility between HYTREAT 1200 and HYTREAT 5300 can significantly reduce the effectiveness of both products. The active biocidal components in HYTREAT 1200 may decompose or become inactive when exposed to the low pH environment created by HYTREAT 5300. As a result, microbial control within the cooling water system may fail, leading to biofouling, microbiological corrosion, and reduced heat transfer efficiency. At the same time, the corrosion and scale inhibition performance of HYTREAT 5300 may also be compromised due to unintended chemical interactions, ultimately impacting overall system reliability and operational performance.

#### **3. Release of Hazardous Gases or Vapors**

When mixed improperly, the strong acidic nature of HYTREAT 5300 may lead to the release of hazardous gases or vapors, especially under confined or poorly ventilated conditions. Potential emissions such as acidic vapors can pose serious inhalation hazards to workers, causing irritation of the respiratory tract, breathing difficulties, or long-term sensitization effects. In worst-case scenarios, chemical decomposition reactions may generate toxic gases, creating an immediate health emergency. This risk is significantly elevated during manual mixing, transfer, or spill situations without adequate ventilation and gas control measures.

#### **4. Increased Corrosivity and Occupational Health Risks**

The mixture of HYTREAT 1200 and HYTREAT 5300 can result in a solution with enhanced corrosive properties compared to either product used alone. This increased corrosivity raises the risk of severe chemical burns to the skin and eyes upon contact, even during short exposure periods. Additionally, the aggressive mixture may accelerate corrosion of dosing equipment, piping, seals, and storage containers, potentially leading to leaks or equipment failure. From an occupational health perspective, repeated or accidental exposure increases the likelihood of chemical burns, skin sensitization, respiratory issues, and long-term health effects, making the mixture particularly hazardous for operational personnel.

### **Mandatory Control Measures**

#### **1. Prohibition of Direct Mixing in a Single Container or Tank**





HYTREAT 1200 and HYTREAT 5300 shall not be mixed directly in the same container, tank, or mixing system. Direct mixing of these products in their concentrated form presents a high risk of uncontrolled chemical reactions due to the incompatibility of their chemical properties. In addition to potentially reducing the effectiveness of each product, direct mixing may significantly increase the corrosivity of the solution and pose serious hazards to personnel. Therefore, each product must be stored, handled, and applied separately in accordance with the safety recommendations stated in their respective Safety Data Sheets (SDS).

## **2. Use of Separate Dosing Systems and Storage Tanks**

Each chemical shall be applied using separate dosing tanks, pumps, and injection lines. The purpose of this separation is to prevent direct contact between HYTREAT 1200 and HYTREAT 5300 before they are fully diluted within the cooling water system. By implementing independent dosing systems, the risks of hazardous chemical reactions, equipment damage, and treatment system failure can be significantly reduced. Separate injection points also help ensure that each product performs its intended function effectively and efficiently.

## **3. Establishment of Safe Injection Time and Location Separation**

During system operation, adequate separation in both time and injection location shall be established between the dosing of HYTREAT 5300 and HYTREAT 1200. This measure ensures that the first chemical is sufficiently mixed and diluted within the system prior to the introduction of the subsequent chemical. By providing appropriate time intervals and spatial separation, the likelihood of direct interaction between the chemicals at high concentrations is minimized, thereby reducing the risk of hazardous reactions and loss of product performance.

## **4. Implementation of Personal Protective Equipment (PPE) and Engineering Controls**

All activities involving handling, transfer, and maintenance of the dosing systems shall be conducted using appropriate Personal Protective Equipment (PPE) in accordance with applicable occupational safety standards. Minimum PPE requirements include chemical-resistant gloves, safety goggles or face shields, protective clothing, and respiratory protection where necessary. In addition, the work area shall be equipped with

