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**INTERNAL CORROSION MONITORING USING CORROSION COUPONS**

**Introduction:**

Internal corrosion is a significant challenge in various industries, including oil and gas, chemical processing, and water treatment. It can lead to equipment failures, reduced operational efficiency, and safety hazards. To mitigate internal corrosion, monitoring techniques are employed to assess corrosion rates and identify potential problem areas. One commonly used method is the utilization of corrosion coupons. This technical synopsis provides an overview of internal corrosion monitoring using corrosion coupons, including their purpose, installation, monitoring, and analysis.

**Purpose of Corrosion Coupons:**

Corrosion coupons are small metallic samples inserted into a process stream or equipment to simulate the same material and conditions as the system being monitored. The primary purpose of corrosion coupons is to measure the rate of metal loss due to corrosion, which helps evaluate the effectiveness of corrosion control measures, determine the need for maintenance or intervention, and estimate the remaining useful life of equipment.

**Installation of Corrosion Coupons:**

Corrosion coupons are typically made of the same material as the equipment being monitored and are installed in representative locations within the process system. Installation methods vary depending on the system design, but common practices include suspending the coupon in a coupon holder or placing it in a coupon rack assembly. Care should be taken to ensure proper coupon positioning and exposure to the corrosive environment.

**Monitoring Process:**

The monitoring process involves periodically retrieving corrosion coupons from the system and evaluating their condition. The frequency of retrieval depends on various factors, including the severity of the corrosive environment, operational conditions, and monitoring objectives. The retrieved coupons are examined for visual signs of corrosion, such as pitting, scaling, or general metal loss. Additionally, weight loss measurements are taken to quantify the amount of metal loss and calculate the corrosion rate.

**Analysis and Interpretation:**

To analyze the corrosion coupons, the weight loss is measured by comparing the initial coupon weight (before exposure) to the final weight (after exposure). The metal loss is then determined by dividing the weight loss by the exposed surface area of the coupon. Corrosion rate calculations are typically expressed in terms of mass loss per unit area and time (e.g., millimeters per year). These corrosion rate values are crucial in assessing the effectiveness of corrosion inhibitors, coatings, or other preventive measures, as well as identifying areas of high corrosion activity.

**Limitations and Considerations:**

While corrosion coupons provide valuable insights into internal corrosion, there are certain limitations and considerations to keep in mind. The results obtained from corrosion coupons represent localized corrosion at specific locations, and extrapolating these findings to the entire system requires caution. Additionally, the retrieval process itself may disturb the system and alter the corrosion environment. Furthermore, the time lag between coupon exposure and retrieval can affect the accuracy of corrosion rate measurements.