

METALNOX® M6353

Aqueous Cleaner for Remanufacturing

Metalnox® M6353 is a heavy duty cleaning chemistry designed to meet the stringent demands of automotive re-manufacturing operations. Metalnox M6353 effectively removes heavily burned-on oils and carbon from aluminum and steel parts without damaging or discoloring. Metalnox M6353 is designed for ultrasonic and immersion cleaning systems. Metalnox M6353 is highly concentrated and provides for an exceptionally long bath life.



- **Effective on Heavy Burned Oils and Carbonaceous Soils**
- **Recommended for Cleaning Aluminum Components in Auto Remanufacturing Operations**
- **Rapidly Splits Oil Out of Solution; Removal via Coalescer and/or Skimming**
- **Contains Corrosion Inhibitors for Aluminum, and all Copper Alloys**

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TABLE OF CONTENTS

Product Description	2
Chemical and Physical Properties	3
Product Use Directions	4
Compatibility Information: Substrates and Equipment	6
Bath Maintenance and Monitoring	8
Shelf-Life, Product Color, Storage and Handling	9
Environmental Considerations	10
 Appendix	
Procedure(s)- Bath Maintenance and Monitoring	

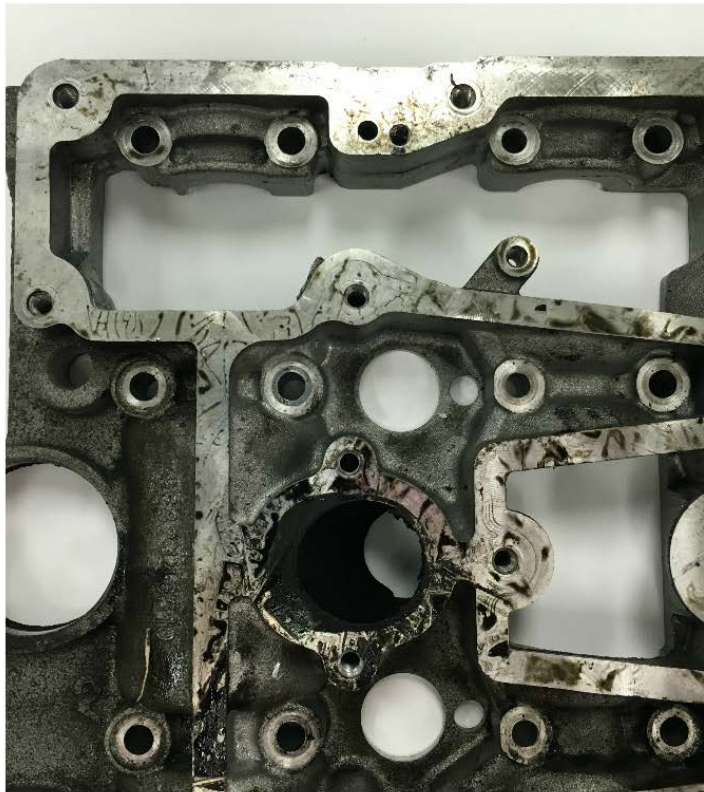
PRODUCT DESCRIPTION

Metalnox® M6353 is an innovative aqueous cleaning solution designed to meet the stringent demands of automotive and diesel re-manufacturing operations. Metalnox M6353 effectively removes heavily burned-on oil and carbon from aluminum and steel parts without damaging or discoloring. Unlike traditional caustic soaps, Metalnox M6353 is safe and rapidly effective at removing years of oils and environmental exposure that is always a challenge for the remanufacturing industry. When rinsed with clean water, Metalnox M6353 will leave a clean, spot-free surface on the parts, ready for the next stage of the remanufacturing process cycle.

Remanufacturing is recognized as the highest form of recycling because like-new products are produced while minimizing the impact on the environment. Remanufacturing conserves natural resources and reduces pollution by:

- Reusing raw materials which would otherwise be mined from the earth.
- Conserving energy by reusing old parts rather than melting them down to raw material.
- Reducing the generation of waste by keeping old parts out of landfills.

Through remanufacturing, we make one of the greatest contributions to sustainable development—keeping nonrenewable resources in circulation for multiple lifetimes.



Before Cleaning with METALNOX M6353



After Cleaning with METALNOX M6353

CHEMICAL AND PHYSICAL PROPERTIES

This KYZEN product is environmentally responsible and operator safe, when handled in accordance with good industrial hygiene and safety practices. *Table 1* summarizes important chemical and physical properties of this product.

<i>Table 1: Typical Chemical and Physical Properties</i>				
Parameter	100% Concentrate	10% Dilution	15% Dilution	Special Values
Clarity	Clear			
Color	Straw			
Odor	Faint			
Flash Point, °C (TCC)	None to boiling			
Boiling Point, °F/C	216°F / 102°C			
Volatile Organic Compound (VOC) gm/L EPA Method 24	30.9 g/L			
Chemical Oxygen Demand, (COD), mg/L (ppm)				30.0 ppm ¹
pH	>13	11.5 – 13.0		11.4 ²
Specific Gravity	1.134			
Weight/gallon	9.5 lbs/gal			
Refractive Index, ° BRIX	25 – 35 °Brix			
MEQ to pH 8.3	1.20 – 1.30			
MEQ to pH 4.0	1.75 – 1.85			
Alkalinity Ratio	1 : 1.4			
Non-volatile Residue (NVR) %	24.6%	2.5%	3.7%	

¹ Value measured at 0.01% Dilution.

² Measured at 10 g/L dilution.

PRODUCT USE DIRECTIONS

Metalnox® M6353 is designed for use in immersion washers. In general, cleaning tool, wash concentration, wash temperature, wash exposure time and rinse exposure time are key elements of process optimization. KYZEN recommends the process parameters below for the majority of applications using Metalnox M6353. Exceptionally difficult cleaning applications should be tested at KYZEN's Applications Lab to identify optimum process parameters.

1. Cleaning Tool:

- Ultrasonic
- Immersion/vertical agitation

2. Wash Concentration:

- Ultrasonic: 10 – 15%
- Immersion: 10 – 15%

3. Wash Temperature:

- Ultrasonic: 130 - 165°F (54°C - 71°C)
- Immersion: 130 - 165°F (54°C - 71°C)

4. Wash Exposure Time

- Ultrasonic: <30- minutes*
- Immersion: <30- minutes*
- *Actual time is dependent on the level of soil present.

5. Rinse Exposure Time

- Spray in air: 30 - 90 seconds*
*Manual flood spray is ok.
- Ultrasonic: 1.5 - 5 minutes
- Immersion: 1.5 - 5 minutes

Additional Process Notes:

1. Metalnox M6353 works best when the cleaning agent is added to the wash tank using an automated injection system. KYZEN offers the following automated chemical injection units:
 - KYZEN Chemtroller
 - A proportioning piston pump automatically adds the cleaning agent and water make-up based on a pre-set ratio.
 - KYZEN Conductivity Control System
 - Automatically adds the cleaning agent based on a signal from a conductivity meter.
2. When using Metalnox M6353 in immersion systems, with non-water-soluble oils, the wash stage should be equipped with a skimmer, overflow weir, or some other means of removing the oil from the surface of the wash bath.
3. Water based corrosion inhibitors designed to protect steel, such as KYZEN® CP90S, can be used in the rinses to provide long-term protection for ferrous metals. However, care should be taken as corrosion inhibitors, while effective on steel, will often leave a visible film on the parts.

4. **Degassing Requirements:** Degassing is a term used to describe the removal of dissolved gasses from a liquid in an ultrasonic cleaning tank. Dissolved gasses reduce the effectiveness and power of an ultrasonic cleaner, since these gasses provide a cushioning effect on the ultrasonic waves generated. However, the dissolved gasses within the fluid are largely removed in the first few minutes of ultrasonic activity. In most cases, ultrasonic cleaners can be used immediately after changing cleaning fluids. When an ultrasonic cleaner is activated after a fresh batch of cleaning fluid has been added, one will notice a huge veil of very fine bubbles rising to the surface from every area of the cleaning fluid. The audible sound generated by the ultrasonic system is also deadened at this time, and the system does not produce the typical sound that the ultrasonic cleaner will produce when the fluid is degassed. Once the veil of bubbles rises to the surface, sound begins to increase in volume, and ultrasonic surface activity begins to generate. At this point, the ultrasonic cleaning system is capable of ultrasonic cleaning. Degassing for extended periods may be required on very large ultrasonic cleaning tanks with liquid capacities over 100 gallons. These tanks may require more than a few minutes to generate effective ultrasonic cleaning activity. Once a fluid is degassed by ultrasonic activity or heating of the cleaning fluid, it does not need to be degassed again. Therefore, degassing is only an issue when cleaning fluids are exchanged with new fluid.

COMPATIBILITY INFORMATION- SUBSTRATES AND EQUIPMENT

All chemicals have the potential to adversely affect substrates and process equipment. As such, the effects of short-term exposure for substrates common to parts and assemblies and the effects of long-term exposure for materials of equipment construction must be considered. *Tables 2, 3 and 4* summarize known compatibility recommendations regarding the use of this product with specific substrates.

TABLE LEGEND

R- Recommended

NR- Not Recommended

T- Test Before Use

Table 2: Plastics and Elastomers

Brand Name	Generic Description	M6353
Delrin™	Acetal	R
Acrylic	Acrylic	T
Nylon	Synthetic Fiber	R
Lexan™	Polycarbonate resin	R
Polystyrene	Polystyrene	T
Polyurethane	Polyester/Polyether	R
PVC	Polyvinyl Co-polymer	R
Black Rubber	Black rubber	T
Pure Gum Rubber	Gum rubber	T
Neoprene	Polychloroprene	R
Phenolics	Phenol	R
Teflon™	Polytetrafluoroethylene	R
Kalrez® 4079	ASTM D395B: FFKM (FFPM)	R
Kynar™	Polyvinyl fluoride	R
Aflas	Tetrafluoroethylene and Propylene	R
Tefzel™	Ethylene/tetrafluoroethylene copolymer	R
Polypropylene	Polypropylene	R
Acculam™	Epoxy glass	R
XLPE™	Cross-linked polyethylene	R
Alathon™	High density polyethylene	R
Viton A or B	Fluoroelastomer	T
Low density polyethylene	Polyethylene	R
Ultem™	Polyether imide	R
Silicone Rubber	Silicone Rubber	R
CPVC	Chlorinated Polyvinyl Chloride	R
Buna-S	Styrene Butadiene	T
Buna-N	Styrene Nitrile Copolymer	T
Ceramics	Composites	R
Glass	Glass	R

Table 3: Metals and Alloys

Substrate	M6353
2024 Aluminum- Bare	R
2024 Aluminum- Alclad	R
2024 Aluminum- Anodized	R
Black Anodized Aluminum	R
3003, 6061 and 7075 Aluminum	R
7075 Aluminum- Alclad	R
Silver	R
Gold	R
Copper	R
1018 Steel	R
304 and 316 Stainless Steel	R
Titanium	R
Steel, Galvanized	R
Magnesium	T
Cast Aluminum	R

Metals, elastomers and plastics can vary greatly in quality. These compatibility recommendations are based on testing of commonly available materials. If your process uses materials that are of lesser quality than those tested by KYZEN, differences in compatibility may be noticed.

Table 4: Equipment

**When considering long-term exposure for materials of equipment construction, the following materials are generally compatible with chemistries used for inline and batch cleaning systems:
(listed in order of resilience)**

Type	Compatibility
EXHAUST	<i>Stainless Steel, Polypropylene, PVC or Galvanized Steel</i>
PUMP SEALS, O-RINGS, GASKETS	<i>Teflon™, Teflon™ encapsulated or EPDM (EPR) Note: Viton is not recommended.</i>
PLUMBING LINES	<i>Stainless steel or Polypropylene</i>
CURTAINS	<i>Polypropylene or Reinforced Silicone (red)</i>
WINDOW / DOOR SEALS	<i>EPDM or Silicone (red)</i>
RTV	<i>Dow Corning 732 or similar high grade</i>

BATH MAINTENANCE AND MONITORING

When a KYZEN bath solution is properly maintained, prolonged bath life can be expected. Spent process baths can be a significant and expensive waste stream for finishing facilities. Numerous factors can degrade bath performance, including depletion or imbalance of bath chemistries and buildup of contaminants from drag-in or other sources. Process bath life can be extended through simple process control and contaminant reduction techniques, resulting in significant waste reductions and cost savings.

Filtration removes suspended solids that could gradually accumulate and lead to sludge build up. A properly designed filtration system with continuous circulation of the process solution should help maintain a uniform bath temperature and concentration. Filtration systems should be sized according to solids loading and flow rate.

DI water should also be used to make up each new bath and supplied for drag-out and evaporative losses

KYZEN recommends CONDUCTIVITY and/or ALKALINE TITRATION TEST KIT to monitor bath concentration.

- Contact your KYZEN Representative to assist you in determining which method is best for your cleaning application.

NOTES AND COMMENTS

- Recommended procedures for bath monitoring are appended to this supplement.

SHELF-LIFE, PRODUCT COLOR, STORAGE AND HANDLING

SHELF-LIFE

Retain samples are taken from every product batch and kept for a minimum of five years. Additionally, randomly selected retain samples of key products are maintained indefinitely. KYZEN determined the shelf life of our aqueous and non-aqueous products by closely monitoring the quality of product samples stored in these retain samples over time. The results of this study provided valuable information on the stability of our products over time.

With few exceptions*, KYZEN products are acceptable for use up to FIVE (5) years, when packaged in sealed containers of five gallons or greater.

Conversely, it is more difficult to predict the long-term integrity of a product in containers holding less than five gallons, as well as unsealed containers of any size. Smaller product containers and unsealed containers are more susceptible to contamination and evaporation, which preclude extended expiration dates. Capping opened containers when not in use can minimize contamination and evaporation. Exceptions to shelf-life are clearly documented on product-specific Certificates of Compliance.

PRODUCT COLOR

For all KYZEN products, *color does not indicate product quality*; therefore, color is not used as a quality control parameter or specification for final product evaluation. KYZEN products are made from a blend of raw materials, some of which are organic solvents derived from agricultural materials. After 20 years of collecting data on KYZEN products containing these raw materials, studies have shown that these materials can contribute to color variances in concentrated and diluted product, as well as slight color variations over time. These same studies confirm that while *color changes may occur, product quality is unaffected*. To assure product quality, KYZEN evaluates each lot of these raw materials to verify integrity before blending.

STORAGE

Store this product in the original container at temperatures between 5-50°C / 41-122°F indoors, or out of direct sunlight. Most products have a freezing point much lower than water and a very high boiling point; therefore, most KYZEN products do not require any special handling to address temperature changes. KYZEN conducts freeze/thaw studies on all products to determine if product quality is affected by such factors and completes further testing if necessary. Following best practices always use the oldest inventory first and keep your stock rotating. *Exceptions to storage temperature requirements are clearly documented on product-specific Certificates of Compliance.*

HANDLING

This product is environmentally responsible and operator safe, when handled in accordance with good industrial hygiene and safety practices. Refer to the Safety Data Sheet (SDS) regarding safe handling practices with this product. It is always a good practice to wear safety glasses or goggles whenever handling industrial chemicals.

ENVIRONMENTAL CONSIDERATIONS

KYZEN products are generally compatible with common primary and secondary waste treatment processes; however, the addition of soils removed during the cleaning process can significantly escalate environmental concerns. These environmental considerations vary widely depending on the cleaning machine and the operating parameters of your particular cleaning process. As such, the selection of the cleaning agent must incorporate the inherent impact on air emissions, water discharges and waste generation from your facility. Each of these three environmental mediums may require a permit depending on the usage rate and existence of other air emissions, water discharges and waste generation at your facility.

What are KYZEN's responsibilities for proper disposal?

- The *United States OSHA Hazard Communication Standard* requires suppliers to provide a Safety Data Sheet (SDS) for all products.
- KYZEN is responsible for providing known information on toxicity testing, health hazards, waste disposal, safe work practices, protective equipment, material reactivity and flammability, etc.
- Note: All information needed to properly classify a product for disposal, wastewater treatment or discharge into a wastewater stream can be found in the product SDS, specifically in Sections Three (3), Nine (9), Twelve (12) and Thirteen (13). *Therefore, KYZEN does not disclose proprietary, non-hazardous product constituents for this purpose.*

What are the end user's responsibilities for proper disposal?

- It is the user's responsibility to seek guidance and rule interpretation from appropriate authorities before applying for any required permits. This is usually accomplished by providing a copy of the product SDS, supplied by KYZEN, to local authorities. Because local regulations are often more stringent than federal regulations, it is imperative for the user to consult with local regulatory agencies before starting a waste water discharge, or introducing new chemicals or chemical processes to an existing permitted waste water discharge stream.
- The three regulatory agencies that a user must review are federal (national), state (regional), and local. Each company must meet the minimum federal standards. The state regulations may be the same or even more restrictive than the federal. Finally, the local community's regulations will be at least as restrictive as state regulations.
- The discharge of any wastewater stream, both by total flow and by chemical make-up must conform to national, regional and local regulations in all nations. Such regulations vary from very strict limits with little derogation to relatively flexible conditions. Many nations, particularly in Europe, have very strict legal requirements dictated on a national scale, covering many aspects of waste water quality. Other nations have less comprehensive regulations, covering only the more important considerations. Local authorities may offer derogations to national legislation if the local treatment plant is able to handle the otherwise out-of-tolerance waste.

The end user is ultimately responsible for compliance with all applicable regulations.

Conductivity Reference Chart

Metalnox® M6353 Alkaline Titration Test Kit Procedure

**Your KYZEN Representative is available to assist you
throughout your cleaning process.**

KYZEN Technical Support

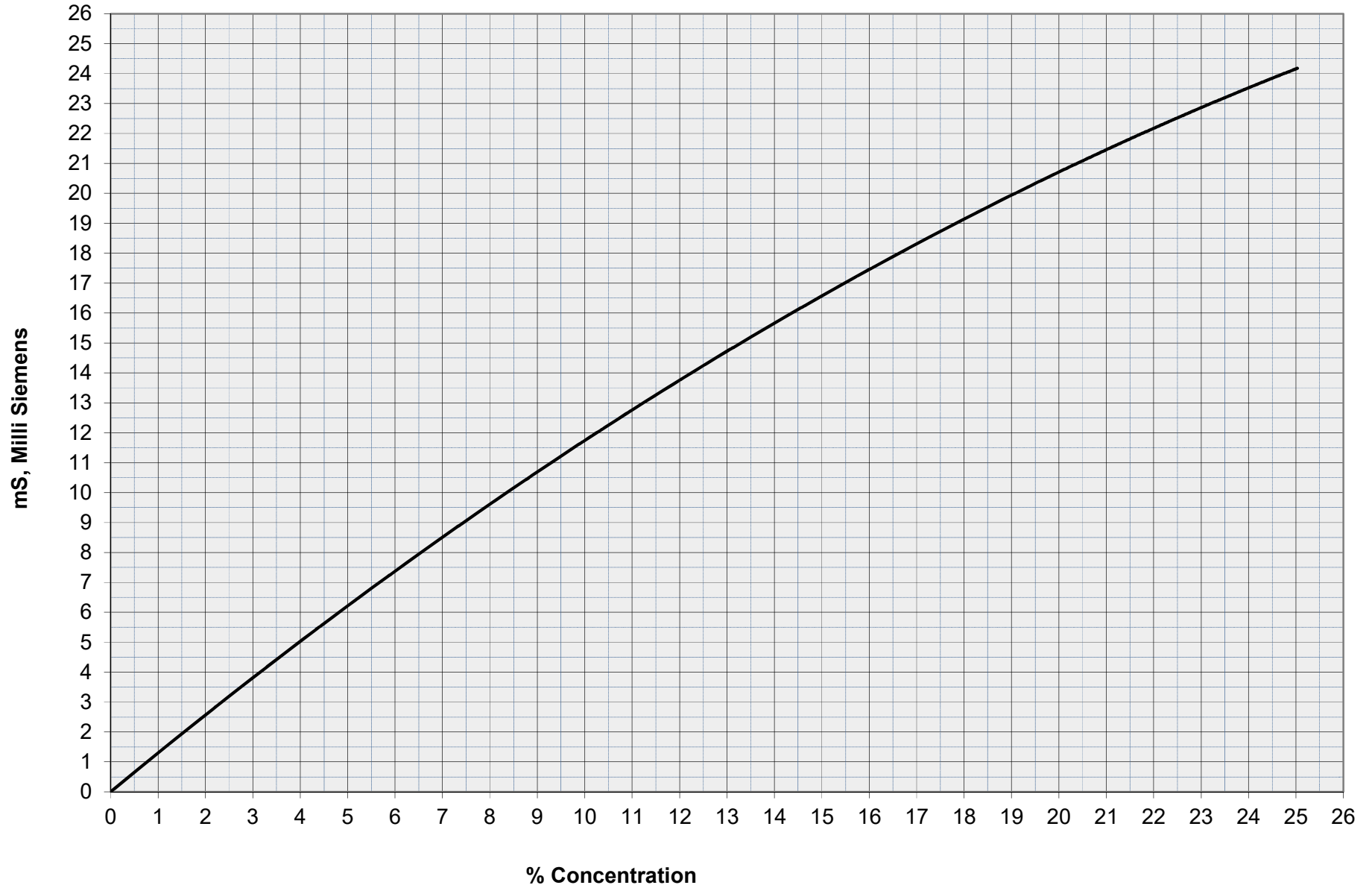
1-800-845-5524

www.KYZEN.com

**For more information on the regulatory compliance of KYZEN products,
please visit www.KYZEN.com/compliance**

Materials furnished under all KYZEN orders are manufactured in accordance with KYZEN Corporation specifications. KYZEN maintains documentation of conformance to these specifications, which is available for review upon request. All raw materials used in KYZEN products are obtained from suppliers on KYZEN's Approved Vendor List (AVL), pursuant to ISO certified standard operating procedures for raw material quality control.

METALNOX M6353 Concentration by Conductivity:
when prepared with tap, DI or RO water



KYZEN ALKALINE TITRATION TEST KIT

Metalnox® M6353 Bath Maintenance Procedure

This procedure defines the equipment and test methods used to measure and maintain bath concentration using the KYZEN Alkaline Titration Test Kit.

REAGENTS AND MATERIALS

INDICATOR- Phenolphthalein

TITRANT- 0.5N Hydrochloric Acid

Graduated Cylinder or Syringe

Erlenmeyer Flask- 50mL

HAZARDS AND PRECAUTIONS

- Wear appropriate Personal Protective Equipment (PPE), including safety glasses and gloves
- For specific safety information, reference the Material Safety Data Sheet for each reagent

PROCEDURE

1. Using a cup, take approximately 500mL of cleaning solution from a thoroughly agitated tank.
2. Using a graduated cylinder or syringe, transfer a **4 mL** sample to an Erlenmeyer flask.
3. Dilute sample with water to the 50mL mark to make the endpoint easier to see. Volume is not critical.
4. Add **2 - 10 drops** of **INDICATOR** as needed to get good color development. Solution will turn pink.
5. While swirling the solution, hold the **TITRANT** bottle exactly vertical to the flask. Add **TITRANT** drop-wise until the pink color just disappears. (Note: pink color may return after a short while.)
6. Record the number of drops of **TITRANT** used.

CALCULATION

Bath concentration can be calculated using the formula on left or by referencing the concentration chart on the right.

$$\% \text{Concentration} = (\#T)(\text{Factor})$$

#T = Number of Drops of **TITRANT** Used

Factor = 0.54

# Drops	% Conc	# Drops	% Conc
2	1.1	28	15.1
4	2.2	30	16.2
6	3.2	32	17.3
8	4.3	34	18.4
10	5.4	36	19.4
12	6.5	38	20.5
14	7.6	40	21.6
16	8.6	42	22.7
18	9.7	44	23.8
20	10.8	46	24.8
22	11.9	48	25.9
24	13.0	50	27.0
26	14.0	52	28.1