

KYZEN® E5325

Spray-In-Air Maintenance and Pallet Cleaner

KYZEN E5325 is used in spray-in-air applications to effectively and efficiently perform off-line maintenance cleaning all while removing even the most difficult flux residues. E5325 is engineered to reduce maintenance and machine down time while increasing production and reducing overall cost.



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PRODUCT DESCRIPTION

KYZEN E5325 is an innovative aqueous cleaning solution designed to meet the stringent demands of preventative maintenance operations. E5325 effectively removes heavily burned-on oil greases and flux buildup common in wave solder and hot air reflow soldering systems. Unlike traditional caustic soaps, E5325 is safe for use on aluminum, copper and steel parts without damaging or discoloring. When rinsed with clean water, E5325 will leave a clean, spot-free surface on the parts, ready for return to production.

KYZEN E5325 will also safely and effectively clean wave solder pallets with built up flux residues in both spray and immersion (air sparge) cleaning processes.

Before



After



Contact your KYZEN representative for pricing and package sizes available.

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.

Parameter	100% Concentrate	10% Dilution	15% Dilution	Special Values
Clarity	Clear			
Color	Light straw			
Odor	Faint			
Flash Point, °C (TCC)	None to boiling			
Boiling Point, °F/C	217°F / 103°C			
Volatile Organic Compound (VOC) EPA Method 24	0.0 g/L			
pH	12.9	11.5 – 13.0		11.0 ¹
Specific Gravity	1.101			
Weight/gallon	9.2 lbs/gal			
Refractive Index, ° BRIX	20 - 30 °Brix			
MEQ to pH 8.3	0.70 – 1.00			
MEQ to pH 4.0	1.25 – 1.55			
Alkalinity Ratio	1 : 1.6			
Non-volatile Residue (NVR) %	19.5%	2.0%	2.9%	

¹ Measured at 10 g/L dilution.

PRODUCT USE DIRECTIONS

KYZEN E5325 is designed for use in spray and 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 E5325. Exceptionally difficult cleaning applications should be tested at KYZEN's Applications Lab to identify optimum process parameters.

1. Cleaning Tool:

- Spray in air
- Immersion

2. Wash Concentration:

- Spray in air: 5 - 10%
- Immersion: 5 - 10%

3. Wash Temperature:

- All 130 - 160°F (54°C - 60°C)

4. Wash Exposure Time

- Spray: <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.
- Immersion: 1.5 - 5 minutes

Additional Process Notes:

1. KYZEN E5325 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.

COMPATIBILITY INFORMATION - SUBSTRATES AND EQUIPMENT

All chemicals have the potential of adverse effects on 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 elastomers and substrates. These compatibility recommendations are based on internet research of E5325's products major formulation materials and internal KYZEN testing on the product as a whole of commonly available materials. Elastomers and plastics can vary greatly in quality For the most accurate results on long-term exposure of your materials, KYZEN is available to perform additional testing.

Brand Name	Generic Description	E5325
Delrin™	Acetal	A
Acrylic	Acrylic	E
Nylon	Synthetic Fiber	A
Lexan	Polycarbonate resin	C
ABS Plastic	Acrylonitrile butadiene styrene	C ¹
PEEK	Polyetherether Ketone	E
PVC	Polyvinyl Co-polymer	A
Natural Rubber	Black rubber	E
NORYL®	PPO™ resin and polystyrene.	A
Neoprene	Polychloroprene	A
PPS (Ryton®)	Polyphenylene sulfide	A
PTFE (Teflon™)	Polytetrafluoroethylene	A
Kalrez® 4079	ASTM D395B: FFKM (FFPM)	A
Kynar	Polyvinyl fluoride	E
Aflas®	Tetrafluoroethylene and Propylene	A
Tefzel	ETFE (ethylene-tetrafluoroethylene)	A
Polypropylene	Polypropylene	A
Hypalon®	Chlorosulfonated Polyethylene (CSPE)	E
Chemraz®	Perfluoroelastomer (FFKM)	E
Alathon	High density polyethylene	E
Viton A or B	Fluoroelastomer	E
Viton GF	Fluoroelastomer	A
Low density polyethylene	LDPE	B ¹
Kel-F® / Neoflon®	PolyChloroTriFluoroEthylene (PCTFE)	A
Silicone Rubber	Silicone Rubber	A
CPVC	Chlorinated Polyvinyl Chloride	A
Buna-S	Styrene Butadiene	E
Buna-N	HNBR / Styrene Nitrile Copolymer	E
Durostone® / Durapol®	Wave Solder Pallet Composites	A
EPDM	Ethylene Propylene Diene Monomers	E

COMPATIBILITY INFORMATION - SUBSTRATES AND EQUIPMENT

Table 3: Metals and Alloys

Substrate	E5325
2024 Aluminum- Bare	A ²
2024 Aluminum- Alclad	A
2024 Aluminum- Anodized	A
3003, 6061 and 7075 Aluminum	A
7075 Aluminum- Alclad	A
Brass_C360, Arsenical, High Tensile	A
Bronze	A
Copper	A
1018 Steel	A
Steel, All ASTM, SAE & EN 10027	A
304 and 316 Stainless Steel	A
Hastelloy™ Alloy-C	A
Magnesium	E
Titanium	A

Ratings - Chemical Effect / 168 Hours

A - Excellent

B - Good: Minor Effect, slight corrosion, or discoloration.

C - Fair: Moderate Effect, not recommended for continuous use.

Softening or loss of strength, and swelling may occur.

D - Severe Effect: Not recommended for any use.

E - Test / Information not available.

Explanation of Footnotes

1-Satisfactory to 72°F (22°C)

2-Satisfactory to 120°F (48°C)

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.

Type	Compatibility
EXHAUST	Hastelloy™ Alloy-C., PVC, CPVC
PUMP SEALS, O-RINGS, GASKETS	Teflon™, Kalrez, VITON GF
PLUMBING LINES	Hastelloy™ Alloy-C, PVC
CURTAINS	Silicone, VITON GF, Extreme
WINDOW / DOOR SEALS	VITON GF, Extreme
Wash Tanks, pumps, machine walls.	Hastelloy™ Alloy-C, 304 & 316 SST

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 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.

KYZEN recommends NON-VOLATILE RESIDUE to monitor bath life.

There are two NVR methods available; the legacy, oven dry testing method as shown in the Application Note on Page 15 or the newest test method that uses the Mettler-Toledo HE53 Analyzer described on Page 16.

Contact KYZEN Technical Support if you have any questions on wash bath monitoring or bath life testing.

NOTES AND COMMENTS

- Recommended procedures for bath life maintenance and monitoring are appended to this supplement.
- KYZEN's Bath Profile Kit / PN# F00206 can help determine NVR and physical properties trends by analyzing six (6) wash bath samples collected over a determined time or number of parts washed.
- A Single Sample Wash Bath Analysis / PN# F00212 is also available to test physical properties and NVR.
- The Mettler-Toledo HE53 Moisture Balance Analyzer and its supporting items can be purchased direct from Mettler-Toldeo or an authorized distributor.

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 25 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 GHS compliant 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

KYZEN E5325 Alkaline Titration Test Kit Procedure

NVR Procedure

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

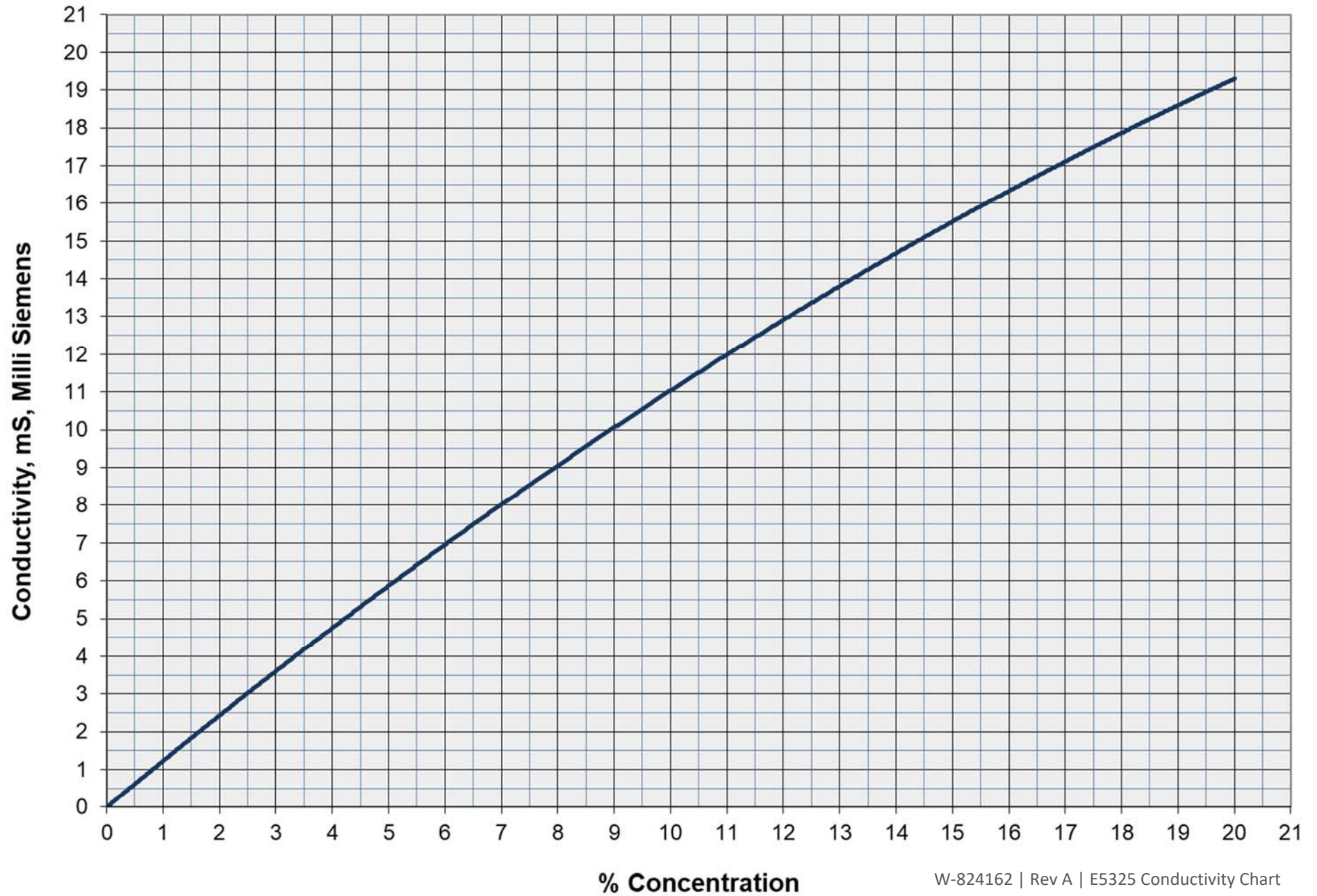
KYZEN Technical Support

1-800-845-5524

www.KYZEN.com

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.

KYZEN E5325 Concentration: Conductivity, Milli Siemens Scale, Using Tap, DI or RO Water



KYZEN ALKALINE TITRATION TEST KIT KYZEN® E5325 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- 125 mL

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 = 0.77

# Drops	% Conc	# Drops	% Conc
1	0.8	17	13.1
2	1.5	18	13.9
3	2.3	19	14.6
4	3.1	20	15.4
5	3.9	21	16.2
6	4.6	22	16.9
7	5.4	23	17.7
8	6.2	24	18.5
9	6.9	25	19.3
10	7.7	26	20.0
11	8.5	27	20.8
12	9.2	28	21.6
13	10.0	29	22.3
14	10.8	30	23.1
15	11.6	31	23.9
16	12.3	32	24.6

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Non-Volatile Residue (NVR) Procedure

KYZEN recommends Non-Volatile Residue (NVR) testing for soil contaminant as a tool for bath life monitoring of certain KYZEN products. A sample of a used wash bath is placed into an aluminum weighing dish and dried at 105°C / 221°F for a minimum of four hours. The residue that remains in the dish is allowed to cool in a desiccator and is re-weighed. The weight of the bath residue is then compared to the residue of a virgin sample of the cleaning product at the same concentration and dried in the same manner.

APPARATUS

Forced Air Oven set at 105°C / 221°F
Aluminum weighing dish
(See Tip Number 1 'Tips for Successful Use' at the end of the procedure)
Analytical Balance
Desiccator

REAGENTS AND MATERIALS

Transfer pipettes
Virgin sample of the product to be tested

HAZARDS AND PRECAUTIONS

For specific safety information, reference the Material Safety Data Sheet for the product you are testing.

STATISTICAL CONTROL

Samples should be analyzed in triplicate. The average of the three analyses is reported.

CALCULATIONS

$$\%NVR = [(c-a)/b] \times 100$$

a = Initial weight of the aluminum dish, b = Initial weight of the sample, c = Weight of weighing dish and residue after heating

$$\% \text{ NVR resulting from soil contamination} = \% \text{ NVR of sample} - \% \text{ NVR of virgin sample}$$

PREPARATION

- A. Set the forced air oven to 105°C / 221°F for a minimum of two hours to allow the temperature to stabilize.
- B. Place the aluminum weighing dishes to be used into the forced air oven at 105°C / 221°F for a minimum of one hour to dry.
- C. Place the dried weighing dishes into a desiccator and allow to cool.

PROCEDURE

- A. Place a cool weighing dish on the analytical balance. Record the weight (*this is weight 'a'*).
- B. Tare the balance and add approximately 10 grams of sample to the weighing dish². Record the weight of the sample to the nearest 0.0001g (*weight 'b'*).
- C. Place the dish in the oven at 105°C / 221°F for a minimum of four hours³. Remove the dish to a desiccator and allow to cool.
- D. Weigh the cooled dish on the analytical balance and record the weight to the nearest 0.0001g (*weight 'c'*).
- E. Repeat Procedure steps A through D a total of three times for both the sample and the virgin product.

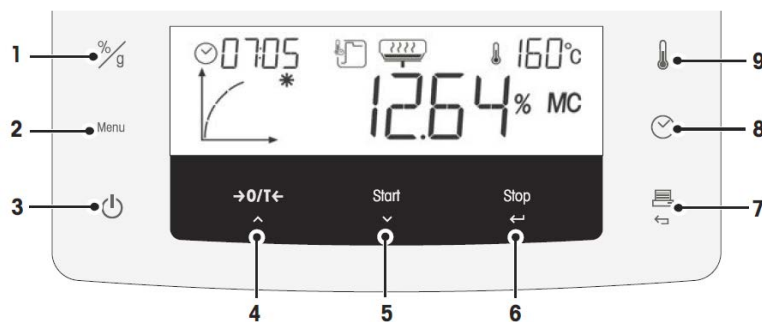
TIPS FOR SUCCESSFUL USE

1. A beaker or ceramic dish can be used in place of the aluminum pan; however, these must be compatible with the cleaning product and able to withstand the required oven temperatures.
2. The amount of sample used for testing is not critical, but must be weighed accurately.
3. A dirtier bath will require longer than 4 hours to completely dry. To ensure that your sample is completely dry, return the sample to the oven for 30 minutes after taking the first weight. Cool in the desiccator and reweigh. Continue this until there is less than 5% change in the weight.

NVR Measurement by HE53 Moisture Analyzer Method KYZEN® AQUEOUS PRODUCTS

This Application Note provides instructions on how to use the Mettler Toledo HE53 Moisture Analyzer to measure the Non-Volatile Residue (NVR) of KYZEN® Aqueous Products.

1. Follow instructions in Section 4 of the *HE53 Operating Instructions* to appropriately setup the moisture analyzer and prepare for measurement.
2. Program the moisture analyzer to the settings below to begin the measurement procedure.



- a. Press Menu [2]. Use the Up [4] and Down [5] arrows to select **PROG** and press Stop [6]. Again, using either of the arrows, select **RAPID** and press Stop [6]. This selects the RAPID DRYING MODE.
 - b. Press Thermometer [9]. Adjust temperature, using arrows, to **120°C** and press Stop [6].
 - c. Press Clock [8]. Use arrows to select **TIMED** and press Stop [6]. Use arrows to adjust to **1 hour** then press Stop [6].
 - d. Press %/g [1]. Use arrows to select **%DC** and press Stop [6]. The results will be displayed in % DRY CONTENT.
3. Place the empty sample pan in the sample pan handler and place the sample pan handler in the draft shield. Ensure that the tongue of the sample pan handler lies in the slot of the draft shield.
 4. Place the provided Glass Fiber Pad in the sample pan. *Note: the pads are designed for single use and a new pad should be used for each test in ensure accuracy of the test.*
 5. Close the heating module and press O/T [4] to tare.
 6. Open the heating module cover and add approximately 2 grams of sample directly to the Glass Fiber Pad in the sample pan.
 7. Close the heating module and press Start [5]. **The %NVR results will display on the screen when finished.**

Condensation may collect and pool in the chamber- this is normal. Follow instructions in Section 9.1 of the HE53 Operating Instructions to clean and thoroughly dry equipment between each use.