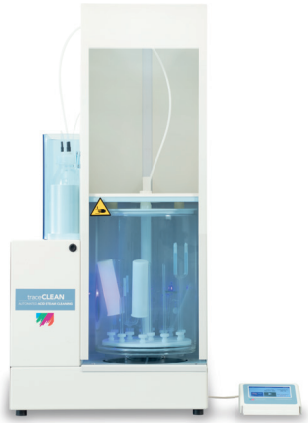
MILESTONE
HELPING CHEMISTS

ACHIEVING LOWER **DETECTION LIMITS** IN TRACE METALS ANALYSIS



Clean Chemistry Line

Clean Chemistry Tools
for Atomic Spectroscopy

90% COST SAVINGS

SUPERIOR CLEANING EFFICIENCY

HIGHER PRODUCTIVITY

GREAT RETURN ON INVESTMENT

AUTOMATED AND SAFE

IMPROVING DETECTION LIMITS WITH LOWER ANALYTICAL BLANKS

The increasing demand for lower detection limits is a major challenge for any laboratory performing trace metal analysis. With the evolution of modern analytical techniques and improvements in quantification limits, it is necessary to control all the factors that can critically impact data quality:

- The purity of the reagents.
- The cleanliness of the material in contact with samples and solutions.
- The sample preparation method.

Acid Purification Systems

duoPUR
Quartz Acid Purification System

subCLEAN
PTFE Acid Purification System

Acid Steam Cleaning

traceCLEAN
Automated Acid Steam Cleaning System

THE ANALYTICAL BLANK

The reagent quality, the cleaning efficiency, as well as the integrity of the digested solutions all have a direct impact on the analytical blank. To address these challenges, Milestone developed a line of Clean Chemistry products, aimed at reducing and controlling the analytical blank, to complement our microwave digestion product line.

LOWERING COSTS IN TRACE METALS ANALYSIS WITH SUB-BOILING TECHNOLOGY

Sub-boiling distillation has demonstrated to be the best method and the most cost-effective approach in acid purification. Unlike conventional distillation, sub-boiling distillation prevents the formation of spray or droplets and yields very high purity acid. Through daily use of purchased acids, the activities of the analyst can affect the purity. On-demand sub-boiling distillation can supply fresh, pure acid and eliminate this common risk.

Milestone applied sub-boiling distillation technology in the duoPUR and SubCLEAN. The duoPUR has two quartz purification units and allows the purification of the most common acids such as HNO_3 and HCl, while the SubCLEAN has a single PTFE-TFM purification still, allowing the purification of HNO_3, HCl and HF too.

GREAT RETURN ON INVESTMENT

In trace metals analysis you often need to use expensive high-purity acids. Applying sub-boiling technology, the cost of reagents can be reduced up to 90%, efficiently purifying reagent grade acids to provide ultrapure acids at the desired quality.

2-X PURIFICATION CAPACITY

The duoPUR provides double distillation capacity for one reagent or simultaneous purification of two different reagents. This is made possible with two quartz distillation units, each equipped with two infared heating elements. The water cooling allows fast condensation of the ultrapure acid into the collection bottle. With the duoPUR you can reliably produce few hundreds mL of ultrapure acid per hour.

AUTOMATIC & SAFE

Simply select a stored method and press “START” on the touch screen terminal, to begin the sub-boiling purification process. Safety and ease of use are ensured by the automatic loading / draining module which minimizes exposure to any acid.

GREAT RETURN ON INVESTMENT

90% COST SAVING

HIGH PRODUCTIVITY

ON-DEMAND ACID PURIFICATION

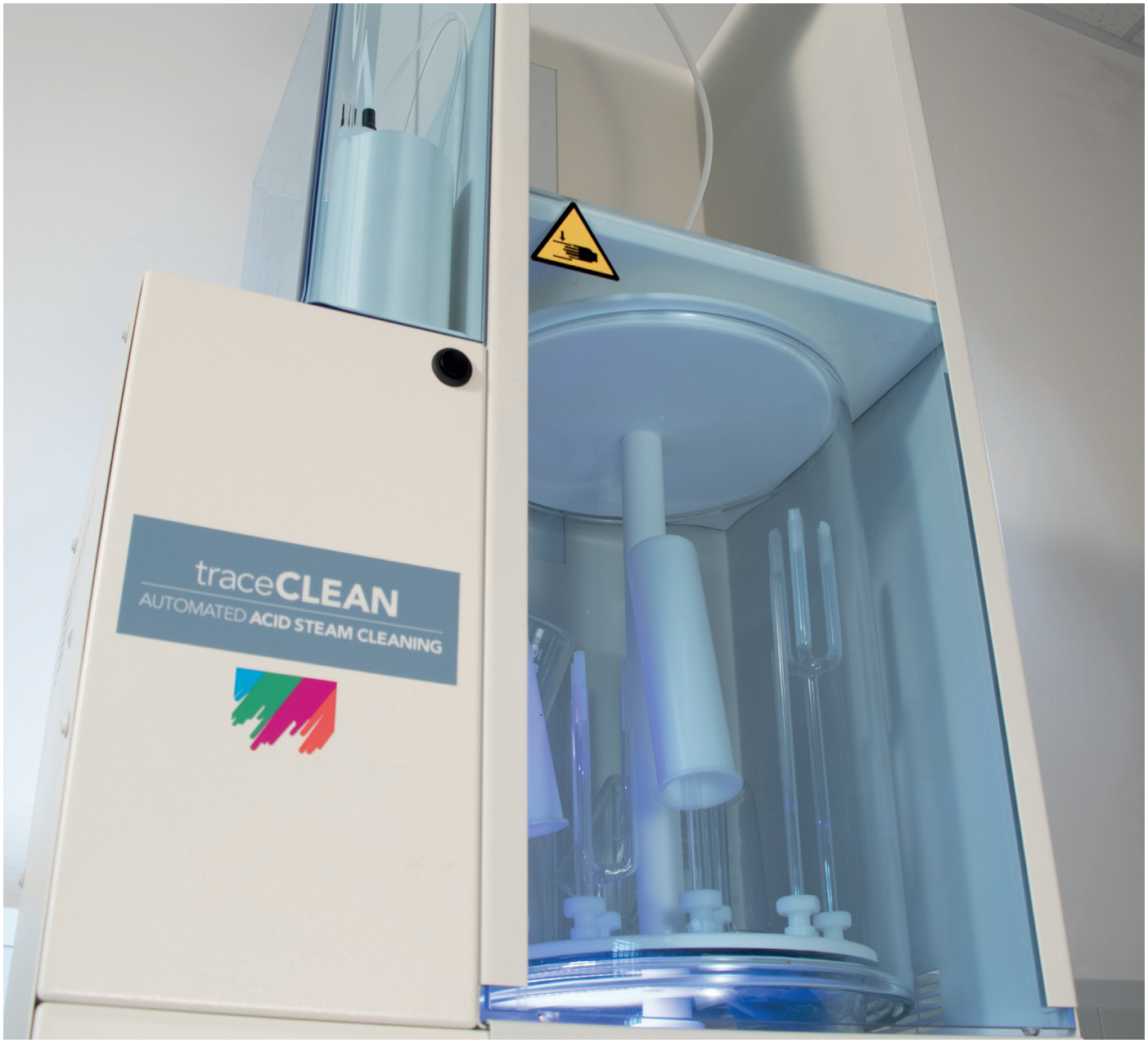
AUTOMATED & SAFE

Element	Single distillation	Double distillation
Ag	<46	<1,5
Al	<557	<147
As	<3	<0,9
Ba	<25	<3,5
Ca	<900	<157
Cd	<8,1	<1,8
Co	<6	<1
Cr	<118	<4,6
Cu	<58	<21
Fe	<1.000	<210
Mg	<195	<42
Mn	<9,7	<2,1
Mo	<7,1	<0,4
Ni	<155	<23
Pb	<10	<2,5
Sb	<6,1	<0,5
Se	<3,9	<1,2
Sn	<22	<9,1
Ti	<59	<8,1
V	<51	<11
Zn	<261	<49

Typical Nitric acid quality with Milestone duoPUR

EFFICIENT CLEANING COUPLED WITH HIGH PRODUCTIVITY

Cleaning is a pivotal step in trace elemental analysis. It directly impacts the blank values and therefore, the ability to achieve lower detection limits. At the same time, it is often a tedious and time-consuming step.



Typical cleaning procedures involve either acid baths or a microwave method to clean digestion vessels, glassware and ICP accessories, both approaches limit productivity and efficiency. The acid steam cleaning process in the traceCLEAN ensures lower blanks, improves your detection limits, without compromising the throughput.

- SUPERIOR CLEANING EFFICIENCY
- FULLY AUTOMATED & SAFE
- IMPROVED WORKFLOW
- SUITABLE FOR LABORATORY GLASSWARE

SUPERIOR CLEANING EFFICIENCY

Traditional cleaning methods require several hours and occupy valuable space in the fume hood. The traceCLEAN process ensures greater cleaning efficiency through freshly distilled hot vapours of nitric acid that leach metal contaminants from the items.

IMPROVED WORKFLOW

The cleaning process with the traceCLEAN takes about an hour, enhancing the overall lab workflow. Digestion vessels, ICP accessories, volumetric flasks, and other glassware can be cleaned, even multiple times during a day.

FULLY AUTOMATED & SAFE

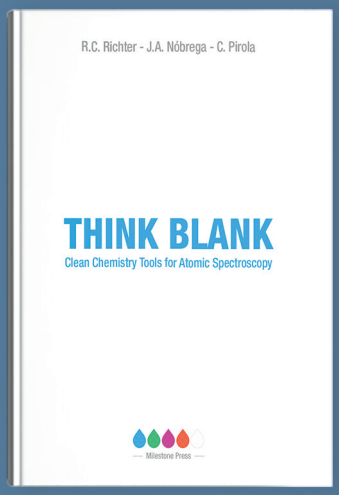
Place the items to be cleaned in the traceCLEAN, through the rotating design of the holder, which simplifies the introduction and removal of all items. Select the program or create a new one and press “Start” on the touch screen terminal.

Element	Microwave cleaning	traceCLEAN cleaning
Al	287 ± 46	258 ± 24
Cd	<72	<72
Co	<56	<56
Cr	<85	<85
Cu	144 ± 39	117 ± 12
Fe	<474	<474
Mg	289 ± 22	232 ± 15
Na	<121	<121
Ni	<55	<55
Pb	<57	<57
Tl	<261	<261
Zn	995 ± 80	<876

Results in pg/g (ppt) in 5% HNO_3 solution.
The microwave cleaning @ 180°C with HCl and HNO_3.
The traceCLEAN cleaning with HNO_3.
New Developments in Automated Cleaning of PTFE, Glass, and Quartz Components used in Ultra-Trace Analysis. Robert Richter. Spectroscopy, June 2001.

THINK BLANK

Understanding how to control contamination and use modern systems for sample preparation are pivotal today, since trace metals analysis is common in many laboratories. Reducing potential contamination involves several steps in the elemental process, including the choice of acid quality, cleaning procedures and sample methods. In each of these processes, the analyst faces specific tasks.



THINK GREEN

For the first time the concepts and significance of green chemistry are applied to trace elemental analysis. The introduction of Single Reaction Chamber (SRC) technology enhances the sample preparation capabilities, moving toward a greener approach. The new performance reduces the reagents volumes, substitutes critical reagents and lowers the acid concentration. The Think Green book collects practical examples on how the green approach can be applied in trace elemental analysis.

MILESTONE
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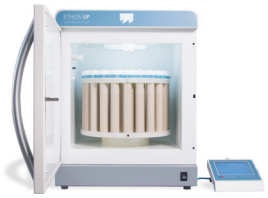
Established in 1988, Milestone is headquartered in Italy with its R&D and manufacturing centre in Germany and Switzerland and offices in the United States, China, Japan and Korea. We operate worldwide through a network of over 100 exclusive distributors, all providing our customers with premium application and service support. Milestone's mission is to help chemists by offering them the most advanced instrumentation for sample preparation and direct mercury analysis in the world. Our industry-leading technology, in combination with fast, responsive service and applications support, allows Milestone to support our goal of giving you the highest return on investment possible.

ADDITIONAL MILESTONE SOLUTIONS FOR ELEMENTAL ANALYSIS



ETHOS UP

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MILESTONE Srl - Via Fatebenefratelli, 1/5 - 24010 Sorisole (BG) - Italy
Tel: +39 035 573857 - Fax: +39 035 575498
www.milestonesrl.com - email: analytical@milestonesrl.com

MILESTONE INC. - 25 Controls Drive - Shelton, CT 06484 - USA
Tel: (203) 925-4240 - Toll-free: (866) 995-5100 - Fax: (203) 925-4241
www.milestonesci.com - email: mwave@milestonesci.com

MILESTONE GENERAL K.K. - KSP, 3-2-1, Sakado - Takatsu-Ku,
Kawasaki 213-0012 - Japan - Tel: +81 (0)44 850 3811 - Fax: +81 (0)44 819 3036
www.milestone-general.com - email: info@milestone-general.com

MLS GmbH - Auenweg 37 D-88299 Leutkirch im Allgau - Germany
Tel: +49 (0)7561 9818-0 - Fax: +49 (0)7561 9818-12
www.mls-mws.com - email: info@mls-mikrowellen.de

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