



THE RESULTS WE DELIVER



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General Overview

HARP is a program delivering sustainability through reclaiming amines as well as providing performance and value to our customers.

HAI's Improved Program to dispose of Scrubber Solution created in Phenolic Urethane Cold Box processing

- Three amines, DMIPA (Sigma Cat 2190), DMEA (Sigma Cat 2195), and DMPA (Sigma Cat 2198) can be reclaimed at a single location.
- An ecologically responsible option - HA-International supports minimizing the foundry's environmental impact. This is the basis of our EcoMission™ program.



EcoMission

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Environmental Benefits

The HAI **HARP** program is the most ecologically responsible option to handle the amine catalyst in the PUCB process.

HARP prevents harmful air pollutants from reaching the atmosphere and reduces a waste stream by allowing for reclamation of the material used in the process.

HARP prevents disruptive issues caused by non-compliance with state and federal regulations, as well as makes the foundry a better neighbor to the surrounding areas.



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Amine Reclamation

Amine sulphate scrubber solution can be sent to HAI's partner facility for reclamation.

The reclaimed amine is chemically identical to virgin produced material and has the same effectiveness in the PUCB process.

The by-product left after the amine is liberated is a salt solution. With proper permitting this solution can be sent through the sewer on to standard water treatment.

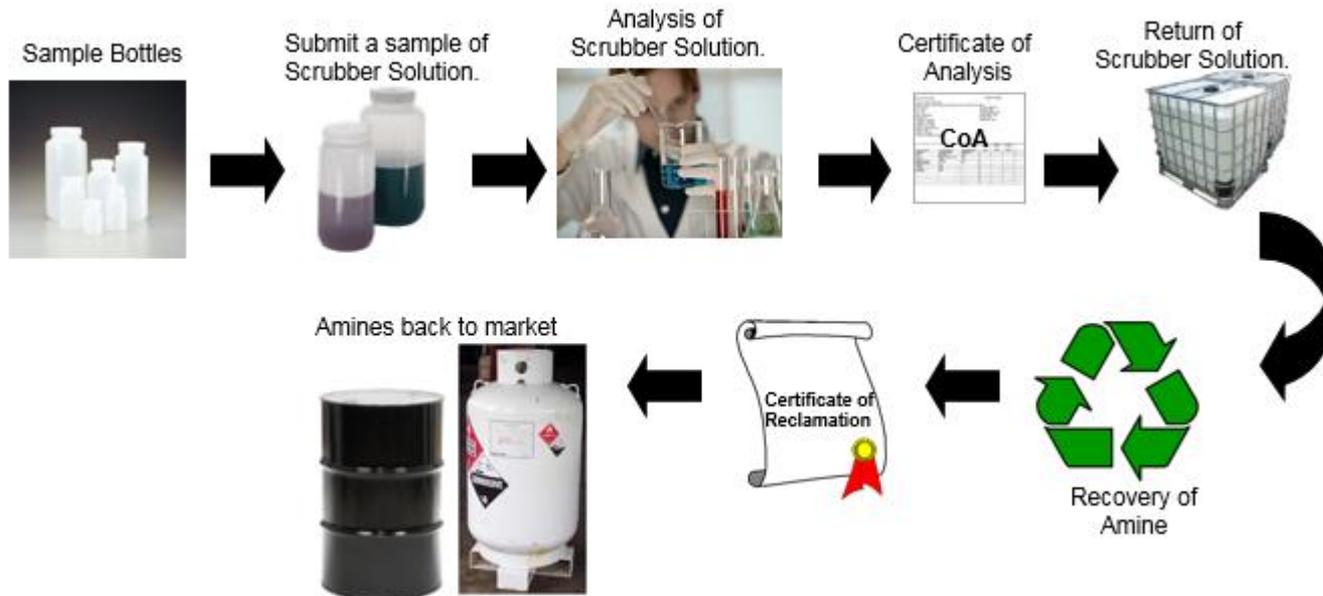


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Reclamation Process

Single source for reclamation of amine scrubber solution and distribution of purchased amines.



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Online Tracking

Located on HA International's online customer portal:



- Submit Amine Recovery Requests
- Receive Sample Bottles and Totes
- Track Amine Recovery
- Receive email notifications
- Download Certificate of Analysis and Certificate of Reclamation

A screenshot of the HA International LLC online customer portal. The top navigation bar includes the HA International LLC logo and links for 'About Us', 'Products', 'Services', 'Innovations', and 'Contact'. Below this, a secondary navigation bar highlights 'Amine Tracker' with a red circle. The main content area is titled 'Amine Reclamation Program' and contains two sections: 'Customer Amine Recovery Requests' and 'Supplies'. Each section has a dropdown menu for 'All Statuses' and a 'Submit' button. The 'Customer Amine Recovery Requests' table lists four requests with columns for 'Requested On', 'Amine Type', 'Request ID', and 'Status'. The 'Supplies' table lists two requests with columns for 'Requested On', '# of Bottles', '# of Totes', and 'Shipped Out On'.

Requested On	Amine Type	Request ID	Status
Oct 12, 2016	DMPA	1911	Recovery Complete
Sep 21, 2016	DMEA	1905	Sample Request Created
Sep 16, 2016	DMPA	1904	Recovery Complete
Sep 16, 2016	DMEA	1903	Sample Approved

Requested On	# of Bottles	# of Totes	Shipped Out On
Oct 12, 2016	0	4	Oct 12, 2016
Oct 12, 2016	1	0	Oct 12, 2016

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Summary of Benefits



- ✓ Single source for reclamation of amine scrubber solution and distribution of purchased amines.
- ✓ Central Midwest location providing the best freight opportunities for the majority of foundries.
- ✓ Online **HARP** Tracker program allows for ease of use when ordering supplies as well as tracking samples and status of reclamation process.
- ✓ Empty Totes and Empty Sample Bottles provided free of charge. (Customer pays freight on returned scrubber solution)

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How to Join

- ✓ Click on the Enroll Now button on the on our Amine Reclamation page on the HA-International website and fill out and submit our **HARP** enrollment form.
- ✓ A HAI representative will contact you to discuss **HARP** and set up your online account.
- ✓ Confirmation and **HARP** login credentials will be sent via email.
- ✓ Login using our online Customer Portal and select the Amine Tracker to begin your reclamation requests.



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Questions?

- ✓ Detailed instructions on using the Amine Tracker as well as on the overall program can also be found in the **HARP** Amine Tracker Instruction Guide available on our website: www.ha-international.com

- OR -

- ✓ Contact your HAI Representative for more details.

- OR -

- ✓ Ayax Rangel, Product Manager
ayax.rangel@ha-international.com, 630-575-5775



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Frequently Asked Questions (FAQ)

Q: How long will it take to get results from submitted scrubber solution samples?

A: Typical turn-around time for sample analysis is 7-10 business days after receipt of sample.

Q: Where do customers get appropriate shipping documents?

A: Sample Bottle and Totes will come pre-labeled and with the necessary shipping documents. Customers can also download address label, and SDS from the **HARP** Tracker program. In case that placards are needed, they are available at: <http://www.labelmaster.com/store/scripts/view-product.cfm?product=ZEZ41760>

Q: What is the typical concentration of sulfuric acid to charge into a scrubber system?

A: Typically customers should initially charge their scrubbers with 40% sulfuric acid solution in order to obtain the best results in amine reclamation. **NOTE:** *Scrubber systems vary therefore always follow the instructions from the manufacturer of your particular system.*

Q: How does a customer know if they have the appropriate concentration of amine in their scrubber solution?

A: Amine content can be tracked as a function of pH. The customer should measure the pH of their system on a regular basis to ensure that their scrubber solution is effective in removing free amine. Assuming the customer initially charges their scrubber solution with 40% sulfuric acid; the acid solution efficiency will begin to degrade after reaching a pH of 3.0 and require replacement. Target pH for exchanging scrubber solution is 4.0, which will give best yield during reclamation. See the information provided in the Amine Scrubber General Design & Operating Principles available on our website.



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Frequently Asked Questions (FAQ)

Q: How does the customer know that their scrubber solution is still actively binding amines?

A: Assuming the customer is initially charging their scrubber with 40% sulfuric acid by measuring pH they can assume that when the pH rises to 3.0 that the free sulfuric acid level is near 5% and therefore not as effective in capturing amine gas.

Q: What happens if the customer scrubber solution sample does not meet the requirements for reclamation?

A: There are still options if the sample analysis determines that the minimum requirements of pH, recoverable amines and free sulfuric acid content are not met. We will work with the customer to determine what steps can be applied to bring the material into specification as well as suggest other alternatives where applicable.

Q: What should a customer do if they experience any functional problems with their cylinders, such as damage or leaking?

A: If a customer has any issues with a cylinder they should immediately contact HA International Environmental Health and Safety (Jeff Krause 630-575-5705) and John Brown (815-595-4268)

Q: Can a customer send in totes of scrubber solution without pre-approval?

A: No, a sample of scrubber solution from each batch is required to be sent for analysis and approval before shipping the scrubber solution in totes.



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Frequently Asked Questions (FAQ)



Q: Do customers have to use the sample bottles provided through HARP for sending samples of spent scrubber solution for analysis.

A: Yes, customers need to use the pre-labeled sample bottles from the program, which are free of charge.

Q: Who pays for the freight on returning totes of spent scrubber solution?

A: The customer is responsible for freight charges on spent scrubber solution.

Q: What are the Certificate of Analysis and Certificate of Reclamation?

A: The Certificate of Analysis is the customer record of their sample analysis. The Certificate of Reclamation is the customer's record and proof that their amine sulphate solution was properly reclaimed.

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