



GAMAJET[®]
part of the Alfa Laval Group

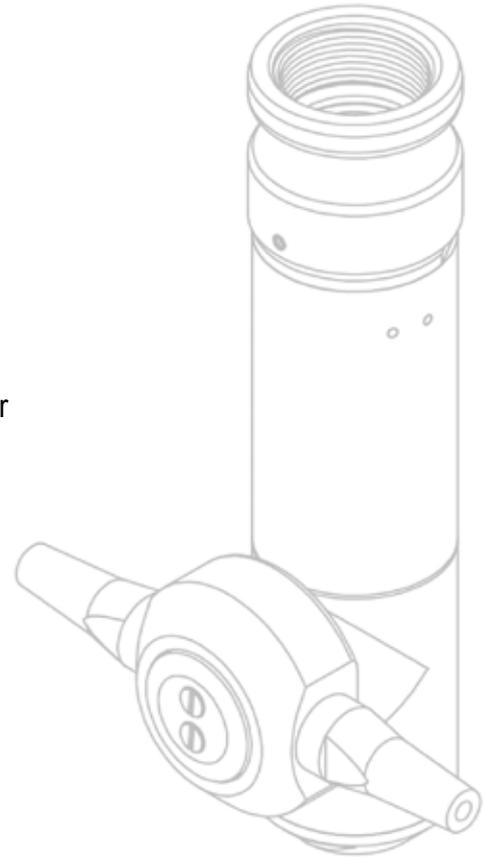
**IT'S A
TANK CLEANING
REVOLUTION**

- 80% Decrease in Water and Chemical Usage
- 85% Decrease in Time Spent Cleaning
- 100% Decrease in Manual Cleaning
- 100% Cleaning Effectiveness

Tank Cleaning Machines and Systems

WHO IS GAMAJET?

- For over 60 years, Gamajet has been manufacturing state-of-the-art, automated tank cleaning machines and systems.
- The majority of machines were developed based on customer requests, including requests from some of the largest companies in the world.
- Every machine is a customized, engineered solution for optimal tank cleaning.
- Gamajet has a solution for every tank, tote and vessel, regardless of shape, size or internal obstructions.
- Utilizing patented rotary impingement technology, Gamajet machines have collectively saved companies billions of gallons of water and chemicals, millions of hours, and have facilitated massive increases in plant productivity and worker safety, all over the world.
- Gamajet proudly became part of the Alfa Laval Group in 2012.



THE FOUR FACTORS OF CLEANING



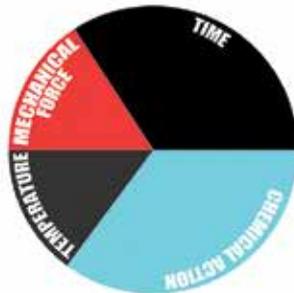
Dr. Herbert Sinner, a former chemical engineer for Henkel, first summarized the basic principles of cleaning in 1959. His summary, now referred to as the Sinner's Circle, describes the four factors that can be manipulated in any cleaning scenario: Temperature, Chemical Reaction, Time, and Mechanical Force. When the effectiveness of any factor is increased, it will result in a decrease of one or multiple other factors. Gamajet utilizes the Mechanical Action to its maximum benefit, resulting in a drastic reduction of the three remaining factors: time, chemical reaction, and temperature (as shown below).

There are many ways to clean a tank, but Gamajet does it the most efficient and effective way:

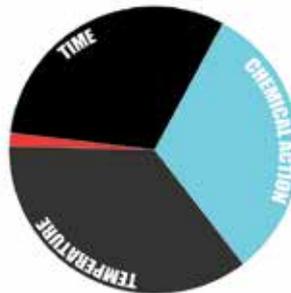
MANUAL CLEANING



SPRAY BALL



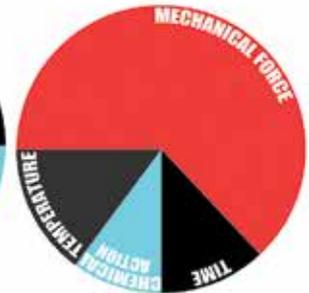
FILL & DRAIN



ROTARY WETTING



GAMAJET IMPINGEMENT



WHAT ARE **THE BENEFITS** OF ROTARY IMPINGEMENT?

- Clean faster and experience less tank downtime and increased production times
- Drastically reduce water and chemical usage for cleaning
- Eliminate the need for confined space entry
- Prevent build-up of debris and cross-contamination
- Preserve product quality
- Cost-effectively meet industry and government standards for cleanliness



BEFORE



AFTER



HOW DOES A **GAMAJET** WORK?

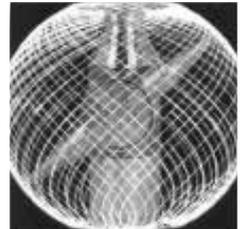
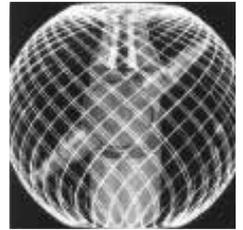
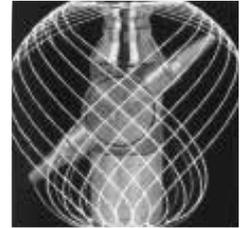
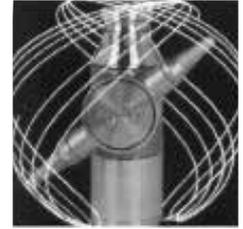
Our automated rotary impingement tank cleaning machines combine pressure and flow to create high impact cleaning jets. Cleaning occurs at the point in which the concentrated stream impacts the surface. It is this impact and the tangential force that radiates from that point which blasts contaminants from the surface, scouring the tank interior. In conjunction with this impact, Gamajets are engineered to rotate in a precise, repeatable and reliable 360° pattern. This full-coverage indexing pattern ensures the entire tank interior is 100% clean, every time. Combining impingement with a controlled cleaning process results in an economic ideal. The Gamajet greatly reduces time spent cleaning, chemicals and water usage. A ROI will quickly show that Gamajet's impingement process positively impacts the ultimate scorecard, your bottom line.



Pictured left:
THE IMPINGEMENT ZONE. Concentrated stream of a Gamajet and the tangential force radiating from the point of impact.

How it Works: **Rotary Impingement Technology**

Scan here for video:



CUSTOMER-DRIVEN SOLUTIONS

Gamajet's longstanding commitment to innovation and product development is well-known. Responding to customer needs has been the foundation of our success. As the leading provider of tank cleaning machines in North America, the quality of our machinery is only matched by an exceptional devotion to the customer. In fact, the vast majority of Gamajet products were developed based on customer requests. When the team at Gamajet has an opportunity to help a customer solve a tank cleaning problem, it not only gets done to perfection, it gets done fast!

Our product line includes:

- Tank Cleaning Machines
- Tank Cleaning Spray Heads
- Custom Mobile CIP Systems
- Custom Tank Cleaning Accessories

(If you don't see your tank cleaning needs outlined in this brochure, let us know and we will design a way that fits your needs best!)



MACHINES FOR CLEANING **LARGE TANKS**



Gamajet Aseptic I

Pressure: 20-80 PSI

Flow Rate: 20-70 GPM

Wash Cycle Time: 3-6 minutes

The first and only rotary impingement machine to meet the requirements of 3-A Sanitary Standard 78-01. Self-draining, self-flushing, and can hit up to 10 lbs. of force at 10'.



Gamajet IV

Pressure: 20-700 PSI

Flow Rate: 30-320 GPM

Wash Cycle Time: 10-25 mins

Our largest automated tank cleaning machine was designed to clean tanks for industrial applications with diameters of over 15' (4.57 m).



Gamajet "EZ-8" VIII

Pressure: 20-1000 PSI

Flow Rate: 25-120 GPM

Wash Cycle Time: 8-12 minutes

Weighing in at only 11 lbs., this machine is one of the most versatile on the market and the easiest to handle. The VIII is used in a variety of industries, sanitary and industrial.



Gamajet PowerFlex

Pressure: 30-500 PSI

Flow Rate: 20-120 GPM

Wash Cycle Time: 8-20 minutes

The Gamajet PowerFlex is a true workhorse, effectively cleaning tanks between 5,000-25,000 gallons in a variety of industries and applications.

Range: 10' to 100' (3m to 60m)
Capacity: 5,000 to 1.5 mil gal. (18,000 to 5.6 mil L)



Gamajet X

Pressure: 50-750 PSI

Flow Rate: 40-80 GPM

Wash Cycle Time: 8-15 minutes

A low profile and high flow tank cleaning machine, the Gamajet X can easily fit through a 4" pipe for safe and easily handling in the fuel storage industry.



Alfa Laval Toftejorg TZ74

Pressure: 44-174 PSI

Flow Rate: 50-140 GPM

Wash Cycle Time: 10-25 minutes

With an impact throw length of up to 43', the Alfa Laval Toftejorg TZ-74 is suitable for vessels from 13,000 to 130,000 gallons. The machine is commonly used for industrial applications.



Alfa Laval Toftejorg TZ67

Pressure: 44-174 PSI

Flow Rate: 45-135 GPM

Wash Cycle Time: 10-28 minutes

Suitable for cleaning processing, storage and transportation tanks between 13,000-130,000 gallons. Used in breweries, food and dairy processes and many other industries and is particularly suited to portable applications where high impact is required.

MACHINES FOR CLEANING MID-SIZED TANKS



Gamajet Aseptic VI

Pressure: 10-700 PSI

Flow Rate: 5-40 GPM

Wash Cycle Time: 10-14 min

Designed for permanent installation, this machine eliminates potential for bacteria growth and easily fits through a 3" opening.



Gamajet IX

"The ToteBlaster"

Pressure: 50-1000 PSI

Flow Rate: 3-30 GPM

Wash Cycle Time: 4-12 minutes

Originally created for cleaning totes but its versatile design allows for cleaning small to mid-sized tanks as well.



Gamajet V

Pressure: 50-1200 PSI

Flow Rate: 5-45 GPM

Wash Cycle Time: 8-11 minutes

The V readily passes through a 3" opening making it ideal for cleaning mid-sized tanks, vats, and vessels. Also available as a directional unit (shown above).



Gamajet NanoJet 2.0

Pressure: 20-200+ PSI

Flow Rate: 5-30 GPM

Wash Cycle Time: 4-20 minutes

Created as a direct result of a major pharmaceutical customer's request, this flow-through machine fits through a 2" tri-clover connection and can be used permanently or portably.

Range: 2.5' to 10' (.75m to 3m)
Capacity: 275 to 5,000 gal. (1,000 to 18,000 L)



Gamajet Alpha FP

Pressure: 50-100 PSI

Flow Rate: 6-20 GPM

Wash Cycle Time: 4-20 mins

Designed to clean and polish above and underground fuel tanks under 1,250 gallons. The Alpha FP is capable of running with diesel fuel as the cleaning agent.



Alfa Laval Toftejorg SaniJet 20

Pressure: 45-150 PSI

Flow Rate: 10-35 GPM

Wash Cycle Time: 5-10 mins

This externally-driven machine is suitable to clean highly viscous or foaming debris from the interiors of sanitary tanks between 130-8,000 gallons.



Alfa Laval Toftejorg SaniJet 25

Pressure: 45-115 PSI

Flow Rate: 25-65 GPM

Wash Cycle Time: 7-12 mins

Made for cleaning tanks in the sanitary industry between 4,000-40,000 gallons and is suitable for industries that follow European Hygienic Engineering & Design Group Guidelines.



Alfa Laval Toftejorg TJ 20G

Pressure: 45-115 PSI

Flow Rate: 25-65 GPM

Wash Cycle Time: 6-10 mins

This rotary jet head was developed to meet the highest standards of efficiency, reliability and hygiene within sanitary processing industries and is capable of cleaning tanks between 4,000 and 40,000 gallons.

MACHINES FOR CLEANING **SMALL TANKS**



Gamajet "EZ-7" VII

Pressure: 50-1500 PSI

Flow Rate: 2-8 GPM

Wash Cycle Time: 2-5 minutes

A small, powerful unit ideal for cleaning all types of barrels, drums and small vessels, the Gamajet "EZ-7" eliminates extensive handling by offering one-step, one-insertion cleaning for industrial applications.



Gamajet GentleJet

Pressure: 60-80 PSI

Flow Rate: 4-6 GPM

Wash Cycle Time: 1-2 minutes

Provides optimal impact for rotary impingement wine barrel cleaning without damaging the barrel's toast, extending the shelf life of the barrel by 1-2 years all while providing a consistent flavor.



Gamajet HD Barrel Blaster

Pressure: 50-1000 PSI

Flow Rate: 3.5-6 GPM

Wash Cycle Time: 2-5 minutes

Perfect for bung-down wine barrel cleaning, the fluid-driven HD Barrel Blaster requires no external power supply and is constructed of heavy-duty stainless steel enabling a service life that is 3 times longer than the average barrel washer.

Range: Up to 2.5' (.75m)
Capacity: Up to 275 gal. (1000 L)



Gamajet All-in-One

Pressure: 50-1000 PSI

Flow Rate: 3.5-6 GPM

Wash Cycle Time: 2-5 minutes

The Gamajet All-In-One Wine Barrel Cleaning Machine combines high performance impingement cleaning with integrated vacuum extraction, which allows all shapes and sizes without drains to be easily cleaned and emptied from the top.



Gamajet All-in-One Flex

Pressure: 50-1000 PSI

Flow Rate: 3.5-6 GPM

Wash Cycle Time: 2-5 minutes

The perfect way to clean without unstacking or unstacking wine barrels, the All-in-One Flex combines our rotary impingement technology, flexible vacuum assembly and custom-engineered vacuum head for easy insertion barrel cleaning.



Alfa Laval Toftejorg

3A Slide Bearing Rotary Spray Heads

(From left to right: SaniMidget, SaniMagnum, SaniMega)

Pressure: 14.5-43.5 PSI

Flow Rate: 30-125 GPM

Wash Cycle Time: 4-8 minutes

Fully 3-A compliant, these sanitary devices feature self-draining, self-flushing capabilities and a patented one-clip assembly feature. Both 270° and 360° spray patterns available for all machines.

COST-EFFECTIVE MOBILE TANK CLEANING SYSTEMS

Gamajet's revolutionary MCIP systems provide optimal tank cleaning without a costly plant overhaul by enabling plants to update cleaning processes with a cost-effective, convenient, portable system. These custom, portable systems are proven to save manufacturing and processing facilities significant amounts of time and money with regard to cleaning practices. Conceptualized, designed, engineered, and manufactured by Gamajet employees and with so many options to choose from, we guarantee a solution that's right for you!



OPTIONS INCLUDE:

- Touch screen system controls with appropriate NEMA enclosures
- Customized PLC logic
- Digital pressure, flow rate, and temperature readout
- Mechanical and electronic timers for cycle and total system run time
- Administrative password protected access to system changes
- Multiple supply pumps option to suit the application
- VFD (variable frequency drive) control pump output
- Multiple inlet and discharge ports
- and more!

Gamajet's custom MCIP systems give you the ability to improve your plant's existing cleaning process without a time-consuming and costly plant overhaul!



No pump? No problem!

GobyJET: Outdoor Portable Tank Cleaning System

Use a Gamajet or multiple Gamajets to clean whenever and wherever with this diesel-powered, high-pressure pump system. Keep your tanks clean and your crew safe!



ToteBlast Station: In-house Tote Cleaning System

Clean your entire tote or IBC (including the top corners), regardless of residue, in-house and under 4 minutes! Experience a quick ROI with this innovative system.

MCIP SYSTEMS

SERVICE&REPAIR CENTER

For an extended shelf-life of your Gamajet or Alfa Laval Toftejorg machine, preventive maintenance every 800-1000 hours is recommended. For maximum results, send your tank cleaning device to our Gamajet facility for expert servicing. **We guarantee a 24-hour turnaround on all service and repairs** so you don't have to worry about excessive downtime. Take advantage of our Best-in-Class Service & Repair Program today and receive a renewed 1-year warranty!

Each machine is field-servicable and sold with a comprehensive owner's manual so our customers can repair their own machines, on site, with a Gamajet technician just a phone call away. Spare parts and support are available at all times.



24-HOUR TURNAROUND!



SUSTAINABILITY

Cleanliness is our backbone, but economical solutions and the safety of our customers are paramount to us. For over 60 years, we have combined industry feedback and our cleaning expertise to develop the best possible equipment for the planet, our customers, and your bottom line.

PEOPLE

Gamajet machines allow for customers to ensure the utmost safety is taken when cleaning tanks through the elimination of confined space entry. Gamajet machines can be lowered into tanks instead of your crew, allowing for a safer work environment.

PLANET

Gamajet machines allow customers to obtain the sustainability goals designed to protect our planet. Through tank cleaning optimization, customers experience water and chemical savings nearing 80% and energy savings averaging around 85%. As a result greenhouse emissions and the overall impact on our environment is significantly reduced. Tank cleaning is typically the number one culprit in water waste. Many customers have obtained their companywide water savings goals through the simple implementation of a Gamajet.

PROFIT

Gamajet machines allow for significant savings of expenditures such as time, chemicals and other operating costs. In addition, the significant savings in time allow for an increase in production and a recovery in revenue resulting in an honest profit. As a result, customers can decrease the negative impact on the environment in perfect harmony with the final bottom line.



CASE STUDIES

Sanitary Applications

DAIRY

In 2012, a leading yogurt manufacturer contacted Gamajet to develop a better CIP cleaning process for their fermentation tanks. Their existing method of cleaning was time consuming, ineffective, expensive, and required confined space entry:

Water Usage: 965 gallons per year

3% CIP solution: 289 per year

Time Spent Cleaning: 6 hours per day

Confined Space Entry? Yes

After Implementing Gamajet:

Water Usage: 232 gallons per year

3% CIP solution: 70 per year

Time Spent Cleaning: 3 hours per day

Confined Space Entry? No

RESULTS:

75% water and effluent discharge savings

75% reduction in chemical usage

50% reduction in cleaning time

Confined Space Entry eliminated

PHARMACEUTICAL

A pharmaceutical company manufacturing a wide range of Active Pharmaceutical Ingredients in New Jersey was experiencing significant revenue loss due to their tank cleaning procedure and were under pressure to provide a more validatable clean and eliminate confined space entry. 3 process tanks, with center agitators, were costing them \$9,000 each in revenue for every hour of downtime. Cleaning included 5 hours of manual cleaning every 3 days. In addition, a 20-hour manual cleaning was performed every quarter.

SOLUTION

2 Gamajet Aseptic VI rotary impingement tank cleaning machines, powered by a Gamajet-designed MCIP System, with a sanitary pump, configured to operate at 120 PSI and 10 GPM (per machine). Cleaning included a 15-minute, open cycle pre-rinse to remove the bulk of the residue, a 30-minute re-circulated wash with a 2% caustic concentrate and a final 15 minute un-circulated wash.

RESULTS:

71% water and chemical savings

82% reduction in cleaning time

\$1 million+ recovered in revenue

Confined Space Entry eliminated

FOOD PROCESSING

Tank Type: 4 ribbon blenders

Tank Residue: Processed meats

Procedure: Tanks are filled with water and agitated, followed by manual cleaning, totaling 4 hours per tank, per day.

Tank Cleaning Downtime: 5,840 hours per year

Water Usage: 26,280,000 gallons per year

SOLUTION

5 directional Gamajet V units operating at 15 gpm (per machine). Cleaning includes a 5-minute pre-rinse, 10-minute wash and a final 5-minute rinse, totaling 20 minutes per tank.

Tank Cleaning Downtime: 486 hours per year

Water Usage: 2,190,000 gallons per year

Water Savings: 24,090,000 gallons: \$112,000 (\$0.00469 per Gal)

RESULTS:

92% less water and chemicals

88% less time spent cleaning

\$112K recovered in water savings

CASE STUDIES

Industrial Applications

OILFIELD SERVICES

A Treatment, Recovery and Disposal plant was designing a new tank wash for their facility. The facility would handle a large number of trailers and tanks used to transport a wide range of oilfield chemicals, drilling fluids and waste and then process all received materials down to clean water, recovered hydrocarbons and class 1 & 2 landfill. A key design objective was for the cleaning process to be efficient, reliable and eliminate confined space entry. The facility was to handle a large quantity of 400 Bbl tanks and the common manual cleaning method was not viable.

SOLUTION

Gamajet E-Z VIII configured for 85 GPM at 150 PSI with a 19-20 minute cycle time. A custom cleaning rig was built to position the 400 Bbl tank over a recovery pit. After cleaning, the effluent was cycled through the de-sludging and filtering processes and the cleaning water reused.

RESULTS:

90% less time spent cleaning
90% less water usage
Maintenance performed on-site
Zero confined space entry required for cleaning

TRANSPORTATION

Gamajet was contacted by an integrated oil field service company who was planning to build a new tank wash facility in Texas. The facility would need to handle over ½ million pounds of drilling fluid recovery per day. In addition, the facility was to be a total recovery location, with all waste being processed to an environmentally safe and disposable state. The cleaning process had to be efficient, minimize effluent, and reduce confined space entry to a minimum.

SOLUTION

The design was a customized manifold with twin Gamajet X machines each configured for 60 GPM at 150 PSI with a 10-minute cycle time while accommodating a small 8" opening. On-site testing was completed and the Gamajets' performance exceeded expectations.

RESULTS:

75% less time spent cleaning
Cleaning fluid recirculated, either diesel or water
Zero confined space entry required for cleaning

BIOREFINING

A major ethanol plant switched from a competing rotary impingement machine to a Gamajet. Below are results:

Number of fermenters: 4
Capacity of fermenters: 500,000 gallons
Hours of operation: 24/7/365

Batches per year: 1,000
etOH yield: 12%
Cleaning time per batch: 90 minutes
Cleaning time per year: 1,500 hours
Gallons of ethanol produced: 60 MGPY

SOLUTION

Gamajet EZ-8

RESULTS:

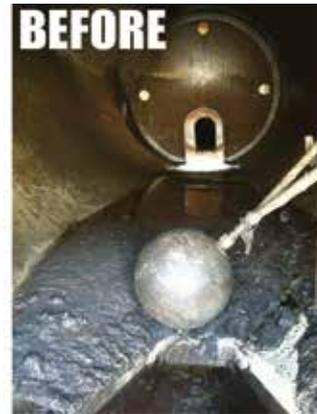
Batches per year: 1,022, +2% increase
etOH yield: 14%, 2% increase
Cleaning time per batch: 45 minutes, 50% faster
Cleaning time per year: 766 hours, 50% reduction
Gallons of ethanol produced: 71.5 MGPY,
20% increase

READ MORE AT <http://www.gamajet.com/media/casestudies/>

THE PROOF IS IN THE PERFORMANCE



Food processing tank with center agitator



Oilfield services industry: mud trailer cleaning



Personal care processing industry: tote cleaning

3 out of 4 of the leading processing manufacturers use and trust Gamajet as **the solution** to their tank cleaning applications.

WHAT INDUSTRIES DOES GAMAJET SERVE?

- Food and Beverage
- Personal Care
- Pharmaceutical
- Cosmetic
- Wine
- Dairy
- Bio-pharmaceutical
- Brewing
- Distilling
- Petroleum
- Biorefining
- Ethanol
- Transportation
- Portable Sanitation
- Wastewater
- Pulp and Paper
- Chemical
- Marine
- Municipal/Utility
- Paints and Coatings
- Biofuel
- Fuel Storage



✓ Save time.

✓ Save water and chemicals.

✓ Save money.

✓ Ensure worker safety.



Discover a

Better Way to Clean
your tanks.

What are you waiting for?



About Alfa Laval

Alfa Laval is a leading global provider of specialized products and engineering solutions, based on its key technologies of heat transfer, separation and fluid handling.

Gamajet was acquired by Alfa Laval in 2012. The combined portfolio of Gamajet and Alfa Laval Toftejorg tank cleaning machines provides companies with the widest offering of tank cleaning options for any size or application.



JOIN THE REVOLUTION

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