



*Advanced Chemical
Cleaning & Descaling
Solutions for Industries*

Arudra is a global leader in industrial chemical cleaning services, delivering turnkey solutions for power plants and process industries. With a strong foothold in India and a growing presence across Asia, Africa, and Central Asia, Arudra has executed successful projects in countries like Oman, the Philippines, Indonesia, Bangladesh, and more. Our reputation as a trusted partner is built on high-performance results, cost efficiency, and strict adherence to environmental compliance.



Services

- ✓ Boiler Chemical Cleaning – Pre-Operation & Post-Operation
- ✓ Steam Blowing Services
- ✓ Pre - Boiler System cleaning
- ✓ Condenser, Heat Exchangers & Coolers
- ✓ Auxiliary Boiler Services – Boiler Rental Solutions
- ✓ Foam Cleaning of Air-Cooled Condensers
- ✓ Oil Flushing of Lube & Seal Oil System
- ✓ Pressure Testing and Flushing of Subsea Pipelines instrumentation System
- ✓ Descaling/Chemical Cleaning Advisory Services
- ✓ Bullet Cleaning of Condensor And Heat – Exchanger Tubes
- ✓ Dry Ice Blasting
- ✓ Hydrokinetics TM
- ✓ Hydro-Jet Cleaning
- ✓ Arudra Gel 240® – Cleaning & Passivation of Stainless Steel
- ✓ Rotomol Hydrolazing Cleaning Services



Boiler Chemical Cleaning – Pre-Operation & Post-Operation

Boiler internal surfaces, whether newly fabricated or long in service, accumulate a variety of unwanted materials – from mill scales, oil residues, and welding flux to corrosion products, oxides, and silicates. These deposits significantly impair heat transfer, increase fuel costs, promote localized overheating, and invite under-deposit corrosion.

Our chemical cleaning protocols, developed over 40+ years of field experience, restore the boiler's internals to a clean-metal state – ensuring optimal thermal performance, reduced emissions, and extended equipment life.



Pre-Operational Chemical Cleaning

New boiler systems carry assembly and fabrication residues that must be removed before commissioning. Arudra ensures readiness with:

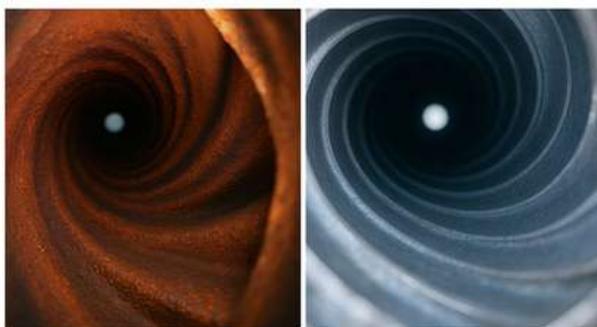
- **Comprehensive contaminant removal:** Eliminates grease, silica dust, grit, rust, and hydrotest scales.
- **System protection:** Ensures clean surfaces for safe firing and long-term performance.

Post-Operational Chemical Cleaning

Boilers accumulate iron oxides, copper deposits, and hard scale over time, affecting efficiency. Arudra's tailored solutions address these with:

- **Customized cleaning strategies:** Including two-stage cleaning, copper stripping, and online methods without shutdown.
- **Performance validation:** Via metal concentration analysis, boroscopy, and visual inspection.

Boiler Tube Cleaning



Before

After

Our Standard Cleaning Sequence Includes:

- **Degreasing/Alkaline Cleaning:** Removes oils, lubricants, and organic films that act as barriers to acid action.
- **Acid Pickling:** Uses inhibited mineral acids to dissolve oxides, mill scales, and embedded rust.
- **Chelation or Citric Acid Rinse (optional):** For specific metallurgy-sensitive systems like stainless steel.
- **Neutralization:** Brings pH back to neutral to prevent acid attack.
- **Passivation:** Forms a protective oxide layer that resists future corrosion.

Steam Blowing Services

Steam blowing is a critical pre-commissioning activity that safeguards turbines, steam lines, and HRSG units by eliminating welding slag, mill scale, and rust. At Arudra Engineers Pvt. Ltd., we specialize in delivering high-velocity steam blowing solutions that ensure operational safety and regulatory compliance before first fire.

We tailor each operation to system conditions, offering both hot and cold blow methods, depending on the line material and expected contamination levels. In cases where in-house steam is unavailable, we deploy rental boilers or portable steam generators to meet on-site needs.



Our core strengths include:

- **Target Plate Analysis:** Visual confirmation of debris removal using A, B, C grading standards.
- **Real-Time Monitoring:** Continuous tracking of pressure, temperature, and blow efficiency to validate performance.
- **Temporary Systems:** Use of engineered piping, silencers, and separators to control noise and discharge.
- **Engineering Expertise:** Support from planning through execution, including documentation for handover.
- **Our steam blowing services comply with international standards including EPRI, ASTM, and VGB guidelines.**

Decades of Proven Experience:

With successful execution in over 200+ thermal and process plants, our track record demonstrates both technical depth and timely delivery under pressure.

Custom Design for Each Application

We perform detailed engineering assessments before mobilization, ensuring compatibility with metallurgy, pressure ratings, and steam volumes required for effective cleaning.

Low Impact, High Efficiency

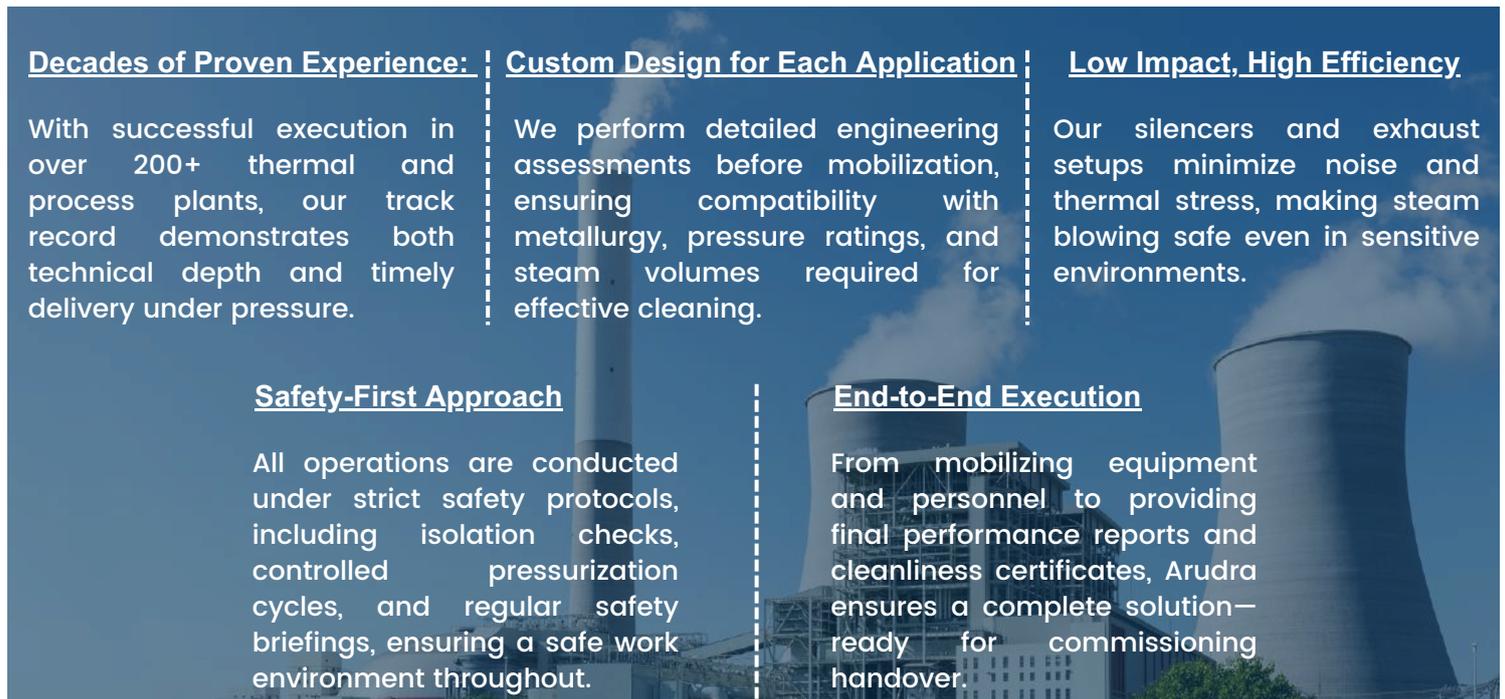
Our silencers and exhaust setups minimize noise and thermal stress, making steam blowing safe even in sensitive environments.

Safety-First Approach

All operations are conducted under strict safety protocols, including isolation checks, controlled pressurization cycles, and regular safety briefings, ensuring a safe work environment throughout.

End-to-End Execution

From mobilizing equipment and personnel to providing final performance reports and cleanliness certificates, Arudra ensures a complete solution—ready for commissioning handover.





Pre-Boiler System Cleaning

Plant delays, shutdowns, or capacity shortfalls shouldn't halt operations. Arudra's Auxiliary Boiler Rental Division offers ready-to-use mobile boiler units for immediate deployment. Our rental fleet supports operations ranging from short-term testing to long-term steam supply for critical processes.

Our Pre-Boiler Cleaning Process Includes:

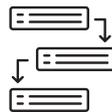
- Flushing and degreasing of feed lines, pre-heaters, and pumps
- Neutralizing agents to stabilize pH and prevent acidic damage
- Hydrotesting assistance with cleanliness validation
- Passivation of carbon steel components to prevent flash rust
- Flow simulation setup to ensure uniform distribution during actual operation



We prepare detailed Doc for QA/QC submission to EPCs or third-party inspectors.



Flushing Diagrams



Flow Plans



Pressure Hold Documentation

Condenser, Heat Exchanger & Cooler Cleaning

Heat exchangers, condensers, and coolers are prone to fouling — from scale, biological slime, corrosion products, and hydrocarbons. Even a millimeter-thin deposit can reduce thermal efficiency by up to 20%. With rising energy costs and tighter emission norms, maintaining clean heat exchange surfaces is not just maintenance — it's profitability.



Arudra Offers:

- **Chemical Descaling:** Using inhibited acid or alkaline formulations tailored to deposit type and metallurgy.
- **Gel-Based Cleaning:** Thickened chemicals cling to vertical or inverted surfaces — ideal for air-cooled heat exchangers and plate-type exchangers.
- **High-Pressure Hydro Jetting:** Ranging from 400 to 1200 bar — for physically dislodging fouling from shell-and-tube units.
- **Online Cleaning Techniques:** For lightly fouled exchangers without interrupting process flows.

Auxiliary Boiler Services – Boiler Rental Solutions

Plant delays, shutdowns, or capacity shortfalls shouldn't halt operations. Arudra's Auxiliary Boiler Rental Division offers ready-to-use mobile boiler units for immediate deployment. Our rental fleet supports operations ranging from short-term testing to long-term steam supply for critical processes.

Our Boiler Rental Services Cover:

- **Startups & Commissioning:** Generate clean steam for line flushing, steam blowing, or system trials.
- **Planned Turnarounds:** Maintain process continuity during shutdowns.
- **Emergency Failures:** Temporary backup during major outages or repairs.
- **Steam Augmentation:** Handle peak load requirements or seasonal demands.

Technical Highlights:

- Boilers from 0.5 TPH to 25 TPH
- Fuel options: Diesel, FO, LDO, or dual-fuel
- Operating pressures: Up to 30 kg/cm²
- Mounted on skids, trailers, or ISO frames for plug-and-play installation
- Integrated accessories: Feedwater tanks, fuel systems, blowdown tanks, safety valves, and PLC-based controls



Trained Boiler Operators



Fuel Management



On-Site Support

This integrated support framework enhances operational continuity, maximizes equipment efficiency, and upholds the highest standards of plant reliability throughout the rental lifecycle.



Foam Cleaning of Air-Cooled Condensers

Foam cleaning is a process uniquely designed to clean the exterior surfaces of Fin Fan Coolers & Air-Cooled Condensers.

This process is used to remove oil, dust, dirt, and other heavy debris that are formed on intricate and inaccessible areas of the coolers

Arudra's unique formulations of foam-ridden solvents have a high penetration capacity combined with suitable properties to reduce surface tension.

Our method has proven to be more efficient and faster than traditional cleaning. Normal high pressure water jetting cleaning destroys the fragile fins, and compacts dirt and debris into the center of the cooling unit, thus significantly reducing cooling efficiency. This is a low pressure cleaning method, which gently soaks away dirt and debris throughout the entire system.



Oil Flushing of Lube & Seal Oil System

Hydraulic systems are highly sensitive to contamination, with even trace particles capable of causing severe issues such as valve malfunction, poor sealing, increased wear, and delayed response in servo valves and cylinders. These disruptions can lead to unexpected downtime, reduced operational efficiency, and costly repairs.

Arudra's Oil Flushing & Sealing Systems are engineered to restore and protect the integrity of hydraulic lines through advanced chemical cleaning techniques. Our process removes residual debris, moisture, and manufacturing contaminants while preserving the system's natural protective oxide layers. This ensures optimal fluid cleanliness and component reliability.

By minimizing the need for repeated flushing and reducing long-term maintenance, Arudra delivers a proven solution that enhances system performance, extends equipment life, and ensures readiness for critical operations.



Pressure Testing and Flushing of Subsea Pipelines instrumentation System.

We specialize in Subsea related Pressure Testing and Oil Flushing of Pipelines using MACDERMID OCEANIC HW 540 and HW 443R Water Glycol.

Our services using MACDERMID OCEANIC HW 540 and HW 443R water Glycol include:

- Hydraulic flushing of small-bore pipelines FAT.
- Pressure testing of 1035 Barg on small bore hydraulic pipeline.
- Preservation of Hydraulic Pipelines.
- Valve actuator flushing and testing.
- Valve actuator function test EFAT.

Other services offered:

- Preservation of chemical lines using MEG 50/50.
- Fresh water flushing of chemical lines.
- Hydro testing of 776 Barg on chemical lines.
- Valve seal test using fresh water Test Rig.
- Torquing service for Subsea valves.



Descaling / Chemical Cleaning Advisory Services

Descaling or chemical cleaning advisory services are critical for industries where scale buildup can significantly impact operations. Arudra offers expert advisory services to assist clients in effectively managing scale and corrosion-related issues in their equipment and systems. Our team of experienced professionals provides comprehensive guidance on the selection and application of descaling and chemical cleaning methods tailored to each client's specific needs.



Bullet Cleaning of Condenser And Heat – Exchanger Tubes

Water formed scaling and Bio Fouling stands as a major burden while operating cooling water equipments and such fouling causes severe heat-transfer problems in addition to impacting the asset life of heat-exchanger/condenser systems.

Bullet Cleaning involves the use of specialized springloaded tube cleaners (bullets) that are shot through the fouled condenser tubes using specially designed water guns at 10-15 kg/cm² pressure. The bullets move through the tube from one end to the other in a linear motion scraping off the deposits and corrosion scales. Water from the gun flushes out the scraped deposits resulting in a clean inside surface for the tube, ideal for good heat transfer.

Arudra were one of the first companies in India to introduce the 'Bullet Cleaning' system to help remove any such fouling inside the condenser tube in the most efficient & environment friendly manner.

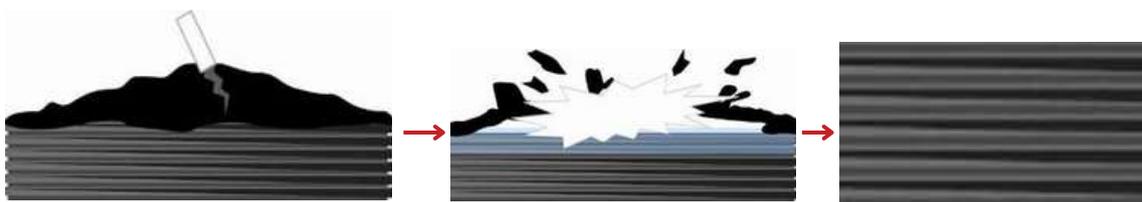


Dry Ice Blasting

Dry Ice Blasting & Cleaning is an eco-friendly, non-abrasive method that uses dry ice pellets to safely remove scale and debris from industrial equipment such as furnace heaters, HRSG/WHRS boiler tubes, reformer coils, tire molds, and turbine rotors.

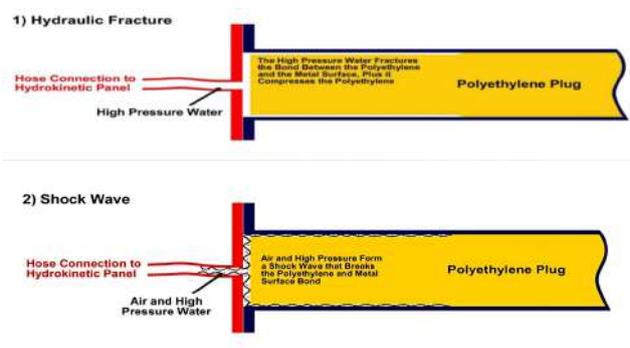
The process is clean, leaves no secondary waste, and can be completed quickly without dismantling equipment.

Arudra offers high-performance dry ice blasting services using heavy-duty equipment operated by skilled engineers, ready for global deployment and guaranteed to meet the highest quality standards.



Hydrokinetics™

- **Multi-Velocity Sonic System:** Hydrokinetics™ by Arudra/AIMM Technologies uses a multi-velocity sonic system for cleaning.
- **Initial Filling:** The process starts by filling the pipe with a multi-cylinder positive displacement pump.
- **High-Velocity Fluid Release:** High-velocity fluid is released into the static fluid to create sonic resonance.
- **Sonic Resonance:** This generates vibrations at different frequencies, detaching fouling material from pipe walls.
- **Safe Projectiles:** Non-damaging projectiles can be used to remove stubborn debris.
- **Repetition:** The cleaning process is repeated as needed until the entire pipe is thoroughly cleaned.
- **Hydrokinetics™ Tool:** The entire process is executed using the Hydrokinetics™ tool for optimal results.



Hydro-Jet Cleaning

Arudra is fully equipped with advanced Hydro-Jet Cleaning systems designed to effectively de-scale pipelines and tubes in industrial equipment such as condenser heat exchangers, boilers, and other heat transfer units, restoring them to optimal performance. Unlike conventional manual descaling methods, hydro-jetting offers a high-pressure, precision-based solution that thoroughly removes scale, sludge, and other stubborn deposits. This not only enhances heat transfer efficiency but also significantly reduces the risk of unplanned shutdowns and drainage-related emergencies.

Hydro-jet cleaning is a critical part of annual maintenance schedules in industries such as power generation, petrochemicals, and steel manufacturing. With extensive experience and a strong track record, Arudra proudly delivers world-class hydro jetting services to clients across India and internationally. Our team of trained technicians and engineers ensures safe, efficient, and timely execution, meeting the most demanding industrial cleaning standards.

Arudra Gel 240[®] – Cleaning & Passivation of Stainless Steel

- **Specialized for Stainless Steel:** Effectively cleans contaminants like iron, oil, rust, and weld slag that reduce corrosion resistance by lowering chromium levels.
- **Restores Corrosion Resistance:** Boosts chromium levels by forming an oxide-rich barrier after cleaning.
- **Versatile Application:** Suitable for stainless steel and alloy steel surfaces, including Hastelloy C276.
- **Superior Adhesion:** Clings well to vertical and overhead surfaces, allowing prolonged contact for deep cleaning.
- **Field-Proven Performance:** Successfully used on FGD system absorbers in power plants and stainless steel storage vessels in refineries.
- **Minimizes Downtime:** Enhances post-commissioning performance and reduces operational disruptions.



Rotomol Hydrolazing Cleaning Services

Hydrolazing is a specialized system of water blasting to descale internals of pipelines, that focuses energy, ranging from 15000 -18000 PSI at 190 liters on to a very narrow surface area.

All debris and mill scale removed from the pipe surface is transported out of the pipe when the high-pressure nozzle is retracted.

Arudra is equipped with the Hydrolazing equipment's to carry out the descaling of new pipeline internals, where the process of passivation is not required.

The equipment can be mobilized to sites across the world and is handled by well experienced engineers.

Arudra's hydrolazing infrastructure can clean 300 NB to 3000 NB pipes, upto 200 meters in a stretch and at a max speed of 0.2 meters per second.

Innovation, Safety & Sustainability



Customized cleaning solutions based on plant configuration, metallurgy, and deposit type



Eco-friendly cleaning agents for minimal environmental impact



Full compliance with international safety regulations and waste management norms



On-site risk assessments and pre-cleaning diagnostics

35+
Years

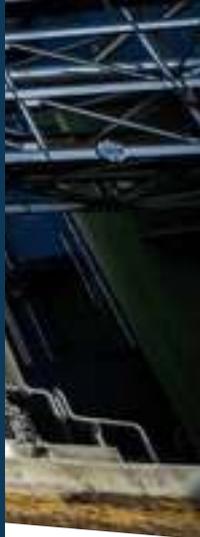
100+
GW of power

15+
Countries

One of the world's leading Chemical Cleaning Service Provider

Partial List of Overseas Chemical Cleaning Works

SR.NO	NAME OF PROJECTS	PLACE	MAIN CONTRACTOR	NATURE OF JOB	PERIOD OF EXECUTION
1	Qatar Vinyl Project State of QATAR	QATAR	CCIC with the consultant of KRUPP UHDE, Germany	Pickling and Passivation of CS Pipelines / Equipments	2000
2	NODCO Expansion Project. State of QATAR.	QATAR	Lurgi Oil Gas Chemie	Alkali Boilout of Boiler, Pickling and Passivation of CS Pipes / equipment.	2001
3	AES Kelanitissa Power Project	Sri Lanka	Larsen & Tourba Ceylinco (Pvt) Ltd, Colombo, Sri Lanka	HSD Fuel Oil Lines	2002
4	Larsen & Tubro Ceylinco (P) Ltd	Colombo	Larsen & Tubro Ceylinco (P) Ltd	Degreasing of 90 m ³ Deareator at AESK	2003
5	Belleli Energy Jabelleli	Dubai	SCO, Dubai	Pickling & Passivation of Hitachi Evaporators	2004
6	Tuffchem Environmental Service PTE Ltd, Singapore	Vietnam	Tuffchem	Alkaline Cleaning of HRSG Boilers	2008
7	Integrated Specialized Gen. Cont. Co. Will (ISCCO)	Ruwais	SK Engg. & Construction (SKEC)	Chemical Cleaning of Compound machine and Discharge tubes	2013
8	Sohar Power & Desalination Project	Oman	Dohat Al Khaleej LLC	Chemical Cleaning of HRSG Boiler	2015
9	Masinloc Power Partners Co Ltd, Phillipines	Phillipines	AES Phillipines	Post Operational Chemical Cleaning of Coal Fired Boiler Unit 2	2016
10	Sepco III Construction L.L.C, Salalah	Oman	Dohat Al Khaleej LLC	Chemical Cleaning of HRSG Boiler	2017
11	Masinloc Power Partners Co, Ltd	Phillipines	Ventanas Phillipines Construction Inc	Chemical cleaning for Feed Water, Heater Shell and Condensate Line.	2018
12	Fired Project Mukim Jimah	Malaysia	Equator Engineering Sdn	Chemical Cleaning of 2X1000 MW Boiler Unit -2 boiler	2019
13	CJP 2 x 1000 MW Coal fired Power Project	Indonesia	PT. Jurong Lestari	2 x 1000 MW boiler Chemical cleaning	2021
14	Tambak Lorak 800 MW CCPP	Indonesia	PT. Jurong Lestari	HRSG Chemical Cleaning	2022
15	Sobhadhanavi CCPP	Srilanka	Lakhdanavi Ltd	Chemical Cleaning & Steam blowing	2024
16	GN Power Mareveles	Coal	Formasa/Trunorth	Post Operational Chemical Cleaning	2025



High-Quality Execution with Global Standards

Our experienced team of engineers operates round the clock to deliver safe, efficient, and timely chemical cleaning services that align with the highest international benchmarks. Leveraging cutting-edge cleaning agents, automated systems, and proven methodologies, we minimize operational downtime while enhancing equipment reliability and lifespan.

With over 40 years of industry leadership, Arudra Engineers Pvt Ltd stands as a trusted partner in delivering precision, professionalism, and environmentally responsible solutions – every time, everywhere.

Specializing in integrated industrial maintenance, shutdown solutions, and advanced cleaning technologies.

Startup Solutions Commissioning & Pre-Operational Support

Arudra provides end-to-end pre-commissioning and commissioning services to ensure every system is clean, tested, and performance-ready. We handle hydro-testing, chemical cleaning, steam blowing, and punch list clearance while coordinating closely with project teams to ensure timely RFC (Ready for Commissioning) certification.

Shutdown Expertise Turnaround & Outage Execution

For planned turnarounds and emergency outages, Arudra delivers integrated mechanical, chemical, and pressure cleaning services. Our teams work in multiple shifts, supporting tight shutdown windows with services like heat exchanger repair, line flushing, boiler cleaning, and on-site fabrication.

O&M Support Plant Maintenance & Cleaning Services

We offer reliable operation and maintenance services for industrial facilities, covering everything from exchanger and condenser cleaning to in-line equipment servicing. Our teams operate safely in live plants without disrupting production – ensuring performance, compliance, and cost efficiency.

Partner with Arudra. Clean. Restore. Perform.


REGISTERED OFFICE

India
Philippines

PARTNERSHIPS

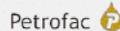
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Singapore

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JOBS EXECUTED

India	Vietnam	Nigeria	Bahrain
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Philippines	Laos	OMAN	
Bangladesh	Indonesia	UAE	
Nepal	Australia	Kuwait	
Thailand	Uzbekistan	Qatar	
Malaysia	Senegal	Lebanon	

Arudra Chemical Cleaning Major Client List




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Arudra Engineers Pvt Ltd
- Chemical Cleaning



Arudra Engineers Pvt Ltd



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