



RAMESHNI & ASSOCIATES TECHNOLOGY & ENGINEERING LLC

Unrivalled Experience in Total Sulphur Management & Decarbonization for Tomorrow's Environment RATE-ACT (Advanced Clean Technologies)

Rameshni & Associates Technology & Engineering (RATE) has the unrivalled ability to address all sulphur removal and handling issues across all industry sectors. In whichever industry sector you operate – oil, gas, upstream, downstream, minerals and metals or power generation — and whatever your sulphur related problem — environmental protection, sulphur removal, smelter offgas cleaning, production, safe sulphur handling and storage — RATE provides sulphur removal and management solutions for large and small projects. Our expertise has been built up over many years and covers all major aspects of sulphur management, providing a unique total sulphur management capability. RATE understands what it takes to create and implement a successful development and our team of global sulphur experts provide quality expertise in environmental assessment, and technology selection. RATE assists our customers in adopting a broader view of the impacts of their operations and incorporates financial, social and environmental risk into their project decisions to deliver optimized and profitable solutions. This initiative delivers projects that are future-proofed with improved risk management for our customers. **RATE IS ISO-9001/2015 CERTIFIED.**



First Class Design for Protection of the Environment

www.Rate-Engr.com

RATE — Profile & Experience

RATE is established from a group of high-qualified engineers who are well known in the industry. Each of our professionals has more than 25 years of experience in the oil and gas industry. This group has licensed and designed hundreds of gas processing, sulphur recovery tail gas treating and sulphur degassing units over the last 25 years.

The combined experience for the RATE group is more than 100 years in the Total Sulphur Management industry. RATE has access to premier technology providers worldwide, has experience with all major licensors and equipment suppliers and most importantly RATE has a number of new innovations; with (10) patents granted in The United States.

RATE — Offering & Capabilities

- Feasibility Studies, Technology Evaluations and Consulting and commercialization
- Licensed RATE technologies and process design for sulphur recovery, tail gas treating, and sulphur degassing units
- Licensed RATE technologies and process design for gas processing, dehydration, and hydrocarbon dew point control, NGL, LPG
- Licensed RATE technologies and process design for amine units and sour water strippers
- Performance guarantees provided for all RATE Technologies
- Training, Start-up and Troubleshooting support
- Technical support for FEED and Detailed Design Contractors
- Catalyst Supply
- FEED and Lump Sum EPC by our worldwide partners including modular packages

RATE has a unique experience offering sustainable technology solutions for all Sour Gas Processing challenges, such as:

- Gathering System
- Inlet headers & Separators
- Inlet Gas Compressors
- Amine Unit Sweetening
- Acid gas Enrichment
- Treated Gas Dehydration
- Hydrocarbon Dew Point
- Sulphur Technology & Tail Gas Treating
- Sulphur Degassing and Granulations

Sour Gas Processing

- From 20 MMSCFD to 4000 MMSCFD
- Meet Pipeline Product Specifications and Environmental Regulations
- Generic or Proprietary Solvents & Polishing Units
- H₂S up to 50%
- CO₂ up to 95%
- COS, CS₂, mercaptans, solids and BTEX Removal
- Mercury Removal
- Elemental Sulphur Removal

RATE has unique experience offering sustainable technology solutions in Refining, such as:

- Amine Unit Sweetening
- Acid gas Enrichment
- One Stage or 2-Stage Sour Water Stripper
- Sulphur Technology & Tail Gas Treating
- Sulphur Degassing and Granulations
- FCC Flue Gas Desulphurization
- Rich "MAX" Partial Acid Gas Enrichment

Sulphur Technologies

- From 3 Tons /d to 2500 Tons / day
- Rich H₂S gas up to 100%
- Lean H₂S gas up to 35%, with up to 500 ppmv aromatics, plus “Rich-SRU” scheme
- Ammonia up to 35% with air, above 35% with oxygen enrichment
- Tail gas Treating from 3 Tons per day to 2500 Tons per day
- Generic or proprietary commercial solvents
- Recoveries from 98.5% up to 99.99+ %
- Modified Claus with Advanced Control System
- “S-MAX” Claus Direct Oxidation, up to 99.2%
- “S-MAXB” Claus Direct Reduction up to 99.5%
- “COKE-MAX” Claus 100% O₂ up to 100%
- SuperSulf (Sub dew point) & Caustic Scrubber
- Ammonia, heavy hydrocarbons, BTEX, and Cyanide Destruction
- Oxygen Enrichment up to 100 % Oxygen
- Natural Draft, Forced Draft, low NO_x, Ultra low NO_x, Staged NO_x Burners, CO Control, Ammonia burning Incinerations
- SO₂ Reduction to Liquid Sulphur

Amine Treating Systems

- From 50 gpm to 20,000 gpm
- Guaranteed to meet product specifications and emissions limits
- Generic or Proprietary Solvents
- Carbon Capture & CO₂ Removal

Sour Water Stripping Systems

- From 50 gpm to 2,000 gpm
- Guaranteed to meet product specifications and emissions limits
- One Stage or 2-Stage SWS Design
- Ammonia and Cyanide Removal

RATE has a unique experience offering sustainable technology solutions in the Sour Gas Fields and the Power sector, such as:

- Amine Unit Sweetening
- Rich “MAX” a Unique acid gas enrichment
- Sulphur mitigation, elemental sulphur removal
- Sulphur Technology (up to 100% oxygen) & Tail Gas Treating
- Lean H₂S Gases with proprietary “Rich-SRU” Scheme
- Sulphur Degassing and Granulations

RATE has a unique experience offering sustainable technology solutions in the Mining and Minerals sector, such as:

- SO₂ Reduction to Sulphur Technologies & SO₂ Liquefaction
- SO₂ Concentration
- Sulphur Degassing and Granulation





RATE — Objective and Culture

Very dedicated, talented and experienced people who have passion about what they do formed RATE. We value our customers by offering first class design, a safe robust design with the latest technologies for meeting our client requirements and protecting the environment. We offer complete services from conceptual studies, licensing and design of units, support for EPC contractors all the way through training and start-up as well as ongoing support after the units are in operation. That is our commitment to our customers.



Turnkey Solutions

RATE is growing internationally. In addition to offering licensed Total Sulphur Management technologies, RATE, in conjunction with world-wide partners in North and South America, Asia, and Europe is able to offer FEED, Detailed Design and EPCM (Engineering, Procurement and Construction Management) services. We jointly deliver international LSEPC, and LS Construction projects, including Modular Packages with our local partners worldwide.

RATE offers full performance guarantees for all projects in Total Sulphur Management. To obtain more information about our licensed technologies and our worldwide partners, Please visit RATE at www.rate-engr.com and contact RATE at Rate@rate-engr.com.

RATE TECHNOLOGY DEVELOPMENT

RATE is continuing to push the boundaries in Sulphur Technology. RATE has recently patented 8 new technologies related to Total Sulphur Management.



Gasification

Zero Emissions: RATE's patented process comprises new techniques for integrating sulphur recovery methods in power plants titled as **Integrated Sulphur Recovery Methods in Power Plants.**

Acid Gas Removal

- H₂S and CO₂ Removal: MDEA, Rectisol, Selexol
- SO₂ Recovery - Chemical or Physical Solvents
- CO₂ Recovery and Carbon Capture
- Mercury & NO_x Removal

SRU & TGU Systems

- 100% Oxygen Enrichment Claus
- Direct Oxidation Claus, Sub dew point process
- Conventional Tail Gas Treating with or without tail gas amine portion
- Unconventional Tail Gas Treating such as Caustic Scrubber
- Recycle Quench OVHD to Selexol or Rectisol
- New Innovation - Replace Acid gas removal and tail gas treating with SO₂ Recovery
- COS Hydrolysis Reactor for lean gases such as Coal to Chemicals application
- Sulphur Degassing and forming
- Supply proprietary burner and catalysts

Mining

100% Recovery: RATE's three patented processes comprise new techniques for SO₂ Reduction to elemental sulphur in mining and smelting operations. (1) **Process for the Production of Sulphur from Sulphur Dioxide with Tail gas Recycle,** (2) **Thermal Reduction of Sulphur Dioxide to Sulphur with Temperature Controlled Furnace.**

- Gas Cleaning Processes
- SO₂ Concentration Using Physical or Chemical Solvents
- SO₂ Liquefaction and storage
- SO₂ Reduction to Sulphur Technologies- New 3 Patented Processes by RATE (High Temperature Catalyst, and Low Temperature Catalyst technologies), and unique catalytic single reaction furnace technology
- Zero Emission – 100% Overall Sulphur Recovery - by Recycling SO₂ stream from SO₂ concentration unit to sulphur Recovery Unit
- 100% Oxygen Enrichment
- Forced Draft Incineration with Heat Recovery System
- Sulphur Degassing and Granulation / forming
- Proprietary Furnace and Burner Design and Supply
- Catalysts supply

RATE-ACT (ADVANCED CLEAN TECHNOLOGIES)

With the sulphur content of crude oil and natural gas on the increase and tighter limits on the sulphur content in fuels, refiners and gas processors are pushed for additional sulphur recovery capacity. At the same time, environmental regulatory agencies of many countries continue to promulgate more stringent standards for sulphur emissions. As the environmental regulations have become more stringent around the world the investors are pushing for 10 ppmv of SO₂ stack or zero emissions.

“RATE- ACT” Advanced Clean Technologies” and SO₂ Emission Control cover various options and the existing facilities can be upgraded as needed by implementing minimum steps only to achieve the new regulations.

Conventional Tail Gas Treating with MDEA solvent	150 - 250 ppm
TG-RATE, Conventional Tail Gas Treating with Selective Solvent, pit vent recycle	50 - 60 ppm
TG-MAX - Tail Gas Treating with Selective Solvent plus new innovation Hydrolysis Reactor, plus recycle pit vent to SRU – Patented Process	25 – 30 ppm
TG-Caustic, Tail Gas Incineration – Caustic Scrubber – non regenerable	0 – 10 ppm
SETR – Super Enhanced Tail Gas Recovery – Patented Process	0 – 5 ppm
SUPERSULF – Claus Sub Dew Point with internal heating and cooling	Up to 99.5%
Mercaptan Removal RATE-Oximer, oxidative air, caustic regeneration with Catalyst	>99.9%
TG-Lean, Lean Acid Gas common Hydrogenation, hydrolysis reactor, quench, common selective amine tail gas treating, Direct Oxidation SRU, incineration	~ 50 ppm
DEGAS-SMART, Independent degassing system in sulphur forming, using Catalytic incineration with caustic	0-10 ppm
RSR Second Generation, RTR 1, RTR 2, total 3 patents for SO₂ reduction to sulphur	0-10 ppm
Super-Degas, the latest degassing technology, new patented technology, minimum residence time	0-10 ppm
S-MAX Claus Sulphur Recovery with direct oxidation catalyst (3-Stage)	Up to 99%
S-MAXB Claus sulphur Recovery with direct reduction and oxidation (4-Stage)	Up to 99.5%



RATE- ADVANCED PROPRIETARY CATALYSTS

RATE has expanded the ability by lining up with the approved suppliers based on OEM Factory (Original Equipment Manufacturing) to supply alumina, titanium, low temperature hydrogenation catalysts, promoted alumina, oxygen scavengers, hydrolysis catalysts, H₂S adsorbents and SO₂ adsorbents in addition to, SMAX direct oxidation and SMAXB direct reduction catalysts. **RATE offers patented technologies among with BEDP with performance guarantees including catalysts.**

RATE- ADVANCED PROPRIETARY SOLVENTS

RATE has expanded the ability by lining up with the approved suppliers based on OEM Factory (Original Equipment Manufacturing) to supply proprietary chemicals, physicals and hybrid solvents in any services regarding H₂S, CO₂ and mercaptan removals. The performance of these solvents are equivalent to other commercial solvents with a better performance. **RATE offers patented technologies among BEDP with performance guarantees including solvents.**

RATE-SRU EQUIPMENT SUPPLY AND MODULARIZATION

RATE has expanded the ability by lining up with the approved suppliers for offering the major equipment in the sulphur recovery designs upon the customer request. In addition, RATE has the ability of offering the SRU, TGU, Amine, SWS, and the dehydration modular packages by providing SRU major equipment as the proprietary equipment based on RATE technologies worldwide.

RATE OFFERS SUPPLYING SRU, TGU, AMINE, SWS, Dehydration, HC Dew Point Control, LPG Recovery, NGL Recovery, Oil & Gas Separation, CO₂ liquefaction and all polishing units like caustic Scrubbing system, SETR, Membrane and all related units in MODULAR PACKAGES



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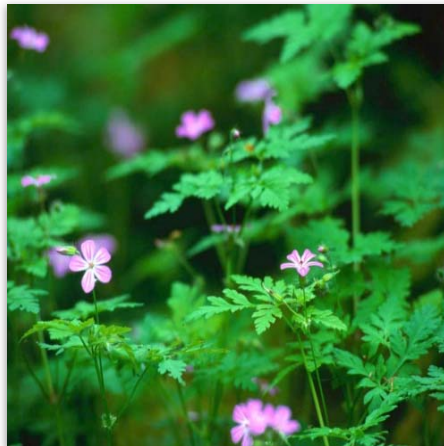
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First Class Design for Protection of the Environment

www.Rate-Engr.com

ISO-9001-2015 CERTIFIED.