Protecting Assets
Measuring Values
COMPANY PROFILE

Raychem RPG

Raychem RPG is a 50:50 joint venture between TE Connectivity, USA and RPG Enterprises, India.

TE Connectivity is a US $11 billion global provider of engineered electronic components for thousands of consumers and industrial products, network solutions and systems for telecommunication and energy markets, undersea telecommunication system and specialty products.

Strengthening Infrastructure Segments of the Economy

Energy - Transmission and Distribution
- Power Cable Accessories
- Raysulate (Insulation Enhancement System)
- Energy Meters & Industrial Products
- Connectors & Fitting
- Insulation & Protection
- Elecast (Personal Protective Equipment)
- Services

Transformer
- Oil Filled Transformers
- Dry Type Transformers (Cast Resin & VPI)
- Special Transformers (Furnace, Rectifier Duty, Convertor Duty, Earthing, Lighting, Scott-Tee Connect)
- Transformers up to 20MVA
- Deltaformer Transformers
- Current & Potential Transformers
- Copper Aluminium Bare & Insulated Busbars

Sustaining Excellence through Engineering, Products and Support

Superior Engineering
Design Head Starts Every Time
RPG Enterprises, established in 1979, is one of India’s fastest growing business groups with turnover touching ₹ 15,000 crores. The group has more than fifteen companies managing diverse business interests in the areas of Tyre, Infrastructure, IT and Specialty.

**Superior Products**
The foundation for success

**Superior Support**
Commits sustainability in product/service deliverance

**Oil, Water and Gas**
- Pipeline Internal & External Coatings
- Cathodic Protection
- Electric Heat Tracing
- Industrial Rectifier
- Power Electronics Equipments
- Water Meters
- Domestic & Industrial Gas Meters
- Regulators

**Telecommunications**
- Copper Cable Accessories
- Fibre Cable Accessories
- Fibre Distribution Management Systems
- Energy Management Systems (For Base Terminal Stations)
- Electronic Component Solutions

**Exports**
- Polymeric Moulded Components
- Sheet Metal Precision Components
- Aluminium Die Cast Products
- Cable Fasting Systems
- Custom Built Metal Components & Assemblies
BUSINESS PROFILE

OWG is dedicated in providing technology based premium quality solutions and products in the field of

• Cathodic Protection
• Flow Management
• Heat Management
• Prevention, Monitoring and Control of Corrosion for buried structures in Hydrocarbon Industry and Water Sector

Cathodic Protection
Raychem RPG provides services for buried structures like Cross Country Pipelines, City Gas Pipelines, Tank Bottoms Plates, Mounded Bullets, Underground Plant Piping, Piles, atmospherically exposed concrete structures, CP Surveys, Internal CP, etc. to industrial giants that include HPCL, IOCL, BPCL, ONGC, NTPC, GAIL, Cairn India, MRPL, RIL, Essar Group, etc. (clients) and EIL, Tractebel, JP Kenny, Meccon, Aker Solution, etc. (PMCs).

Transformer Rectifier Units
Raychem RPG has a dedicated and well equipped unit with in-house capability for design, manufacture and testing of Rectifier Units. All the products are customized and tailor made for key customers / projects from various industries including Oil & Gas, Power, Steel, Chlorination, Automobiles, R&D Laboratories, etc.

Pipeline Coating
Raychem RPG is the market leader in Joint Coatings for Cross Country and City Gas Distribution lines and supplies a wide range of products that include heat shrink products, PE Cold Applied Tape Coating Systems, Liquid Epoxies, Warning Mat, Casing Insulators, Rockshields, etc.
Heat Tracing Systems
Raychem RPG offers a complete range of heat tracing systems including self-limiting, self-regulating heat traces, power limiting heat traces, skin effect current tracing for transfer pipeline, frost heave prevention heat traces, mineral insulated heat traces and hopper heaters.

We offer total Maintenance Solutions for a wide spectrum of applications and provide services in Design, Engineering, Supply, Installation and Commissioning of Heat Tracing Systems and accessories.

With over 25 years of working experience on new and rehabilitation projects, we continue to excel in longevity and environmental standards.

Gas Meters
Raychem RPG is the market leader for Domestic Gas Meters in India.

We offer solutions in Smart Metering (AMR & Prepaid Meters), as well as, meters for High Flow and Pressure Requirement (Turbine Meters & RPD Meters). Moreover, we continuously strive to improve our product offering and increase customer satisfaction levels through technological developments and unmatched after-sales support.

Water Meters
With presence in Gas and Energy Meter business, we have now entered the water meter business catering to Quality Metering Solutions for the Water Industry.

Raychem RPG has signed a collaboration agreement with Sappel, France for providing reliable water metering solutions.

Raychem RPG offers complete Metering Solutions for Gas, Energy & Water Industries
Corrosion is a natural phenomenon. The state of metal changes to a lower energy state when any metal surface comes in contact with water and air. This leads to the formation of a compound called rust. Corrosion is very severe in submerged structures. A metal surface, when exposed to environment, develops spots that form electro-chemical cells and corrosion at anodic (positive) points.

Facts Related to Corrosion
- Internationally one tonne of steel turns into rust every 90 seconds
- Energy required to make 1 tonne of steel is equal to the energy consumed by 1 family over 3 months
- 50% of steel produced world over is used to replace rusted steel
- One rupee invested in corrosion control saves seven rupees worth of corrosion loss
- Corrosion loss is approx. 3 - 4% of GNP in each country

History has witnessed cases of Oil, Water and Gas spillage due to corrosion, causing huge impact in economy and environment. Cathodic Protection (CP) is achieved by maintaining the flow of electrons from externally placed Anodes (+ve) through electrolyte (soil, water, concrete, etc.) into the surface of structure being protected, making it as cathode of electrochemical cell. CP removes the root cause of corrosion and stops it permanently.

CP Turnkey Projects
CP is a turnkey contracting business of Raychem RPG having in-house expertise in Design, Engineering and Execution of high valued and complex CP Projects. Since 1989, we have served clients to their utmost satisfaction, resulting in a bond of trust that has grown year after year.
CATHODIC PROTECTION

Services offered by Raychem RPG

- Pre-design
- Survey
- Engineering
- Design
- Equipment / Material Design, Manufacturing, Test, Inspection & Supply
- Shipping and Transportation
- Installation
- Commissioning & Start-up Spare Parts
- Post Commissioning Survey & Maintenance

Industries covered by CP - Contracting

<table>
<thead>
<tr>
<th>Underground Vessels</th>
<th>Auto LPG Dispensing Station</th>
<th>Storage Tanks Bottom Plates</th>
<th>Health Monitoring Survey</th>
<th>Internal Cathodic Protection</th>
<th>AC, DC Interference Detection &amp; Mitigation</th>
<th>Cross Country Pipeline</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cathodic Protection Audit</td>
<td>Mounded Bullets</td>
<td>RCC Structures, Jetties &amp; Piles</td>
<td>Plant Piping</td>
<td>Annual Maintenance Contract</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

List of Products

- AC / DC Transformer Rectifier Units (Manual / Automatic & Oil / Air-cooled Type)
- Long Line Polymeric type Anodes-Anodeflex
- MMO Tubular / Linear Type Anodes
- Hi Silicon Chromium Type Anodes
- Sacrificial Type Anodes (Magnesium / Zinc / Aluminium)
- Anodes / Cathode Junction Boxes
- Reference Electrodes (Portable / Permanent)
- Polarization Cells
- Surge Arresters
- Monolithic Joints / Insulating Gaskets
- Cables & Cable Accessories
- Anode Caps
- Data Logger & Remote Monitoring Systems
- Electrical Resistance (ER) Probes
- Computerized Test Station Unit

Industries covered by CP - Contracting

- Auto LPG Dispensing Station
- Storage Tanks Bottom Plates
- Health Monitoring Survey
- Internal Cathodic Protection
- Cross Country Pipeline
CP System for Plant Piping

Refineries, Petrochemical Complexes, etc. have very complex piping systems running underground for which Raychem RPG provides CP against corrosion to prevent loss of valuable material and probability of hazards that may arise in the system.

Once the pipeline is corroded, finding the root cause of the problem and fixing it, can be a very difficult task. While repair work is in progress, the plant may be required to shut down, resulting in loss of precious operational time.

CP System for Cross-Country Pipeline

Raychem RPG undertakes CP projects for Cross-Country Pipeline ranging from few kilometers to thousands of kilometers. The Company has experienced CP engineers and NACE certified corrosion specialists for designing and executing CP projects.

Following are some of the major projects that underline our expertise.

<table>
<thead>
<tr>
<th>CLIENT</th>
<th>PROJECT</th>
<th>SCOPE OF WORK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gail India Limited</td>
<td>Dabhol Bangalore Pipeline</td>
<td>300 km</td>
</tr>
<tr>
<td>Hindustan Mittal Energy Limited</td>
<td>Mundra Bhatinda Pipeline</td>
<td>470 km</td>
</tr>
<tr>
<td>Reliance Gas Transportation and</td>
<td>East West Pipeline</td>
<td>470 km</td>
</tr>
<tr>
<td>Infrastructure Limited</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indian Oil Corporation Limited</td>
<td>Chennai Bangalore Pipeline</td>
<td>220 km</td>
</tr>
<tr>
<td>Gujarat State Petronet Limited</td>
<td>Anand Rajput Pipeline</td>
<td>123 km</td>
</tr>
<tr>
<td>Hindustan Petroleum Corporation Limited</td>
<td>Pune Solapur Pipeline</td>
<td>343 km</td>
</tr>
</tbody>
</table>
CP System for Storage Tanks and Mounded Bullet

Expensive and hazardous material stored in these vessels may start leaking and going unnoticed, causing failure due to corrosion leading to loss of material and increasing chances of hazards in the system.

Raychem RPG provides:
- CP to storage tank bottom plates of different diameter tanks
- CP to LPG Mounded Bullets of all sizes

CP System for Remote Monitoring using SCADA facility

Raychem RPG has successfully designed, engineered and commissioned Remote Monitoring CP (RMCP) Systems to monitor and control ICCP Systems from centralized control rooms.

In case of faults, ICCP System controlled and monitored through RMCP System, can send e-mail and SMS messages for immediate and corrective actions.

SCADA software allows CP process viewing in pictorial and graphical forms in several user friendly screen shots.
Cathodic Protection Survey

Health Monitoring Survey
Underground structures need to be checked for their healthiness, as well as, to identify the need of protective measures for extending its life.
- Current Drainage Survey
- PSP Profile Survey

CP Survey
Raychem RPG provides assistance to ascertain healthiness of pipeline structures. Data is collected and analyzed to verify the current status of these structures and actions are recommended to increase its life.
Raychem RPG has expertise in carrying out following surveys:
- Post commissioning Survey
- Current Interruption Potential Logging (CIPL)
- Direct Current Voltage Gradient (DCVG)
- Current Attenuation Test (CAT)
- Pearson Survey
- Interference Survey
- Soil Resistivity Survey

Prestigious CP Survey Jobs carried out by Raychem RPG

<table>
<thead>
<tr>
<th>CLIENT</th>
<th>PROJECT NAME</th>
<th>SCOPE OF WORK</th>
</tr>
</thead>
<tbody>
<tr>
<td>GAIL India Limited</td>
<td>Hazira Vijaipur Pipeline / Dabul Vijaipur Pipeline - 1</td>
<td>CIPL, DCVG &amp; CAT Survey for 1300 km of Pipeline</td>
</tr>
<tr>
<td>Indian Oil Corporation Limited (IOCL)</td>
<td>Chennai Trichy Madurai Pipeline</td>
<td>CIPL, DCVG &amp; CAT Survey for 450 km of Pipeline</td>
</tr>
<tr>
<td>Indian Oil Corporation Limited (IOCL)</td>
<td>Western Region Pipeline</td>
<td>CIPL, DCVG &amp; CAT Survey for 400 km of Pipeline</td>
</tr>
<tr>
<td>Indian Oil Corporation Limited (IOCL)</td>
<td>Guwahati Siliguri Pipeline</td>
<td>CIPL, DCVG &amp; CAT Survey for 200 km of Pipeline</td>
</tr>
<tr>
<td>Hindustan Petroleum Corporation Limited (HPCL)</td>
<td>Pune Solapur Pipeline</td>
<td>CIPL, DCVG &amp; CAT Survey for 250 km of Pipeline</td>
</tr>
<tr>
<td>Petronet MHB Limited</td>
<td>Mangalore Hassan Bangalore Pipeline</td>
<td>CIPL, DCVG &amp; CAT Survey for 250 km of Pipeline</td>
</tr>
</tbody>
</table>
CATHODIC PROTECTION

Concrete Cathodic Protection

RCC Structures are constructed with long term expectations, but with time and attack of corrosion agents, reinforcement bars start corroding, subsequently reducing the strength and stability of structures, requiring additional rehabilitation cost. Corrosion of steel in concrete is one of the major reasons for collapse of marine structures much before their useful life is over, especially in marine environment and coastal areas, due to presence of salt. Periodic repairs of damaged concrete will not solve the purpose since the cause of corrosion is not eliminated.

Understanding corrosion to be a major problem for RCC structures, causing heavy rehabilitation costs and loss of operations time, Raychem RPG provides CP to RCC Structures. The technology is able to protect the structure against corrosion for design life of the structures.

Since decades, CP has emerged as a one-time, long term solution to the problem of corrosion of RCC Structures. CP is a electrochemical process that stops corrosion reactions and protects the structure. It also repels salts away from the structure and maintains alkaline environment at the steel surface, removing all causes of corrosion from its root.

Broadly two types of CP are available, i.e. sacrificial and impressed current CP Systems, which are capable in protecting marine structures under severe environmental conditions. Raychem RPG has vast experience of executing jobs for underground RCC structures, as well as, atmospherically exposed RCC Structures. We also have experience in providing CP to Jetties, Piles, etc. in marine environment.

We provide CP Services for rehabilitation of marine RCC structures. The deteriorated structures are cathodically protected at the time of rehabilitation. CP System installed guarantees protection of structure for the next 30 years, thus eliminating any further cost of rehabilitation due to corrosion.

Raychem RPG has a dedicated and specialized team for working on Limit Concrete CP Projects.
AC / DC HT Line Interference Mitigation

Raychem RPG is an established leader in corrosion control with unparalleled experience in AC detection and mitigation. With experience of protecting thousands of miles of pipeline and ancillary facilities, Raychem RPG has confidently handled AC interference issues ranging from one pipeline and one power line in a simple cross-country setting, to multiple pipelines and multiple power lines in congested urban corridors.

It is increasingly common for a new pipeline to be constructed in existing high voltage overhead power line right-of-way and for new power lines to be placed near an existing pipeline. When underground metallic pipeline is in close proximity to high voltage power transmission lines, an electromagnetic field is created by the alternating current (AC). AC interference can result in severe corrosion of the pipeline. In certain instances, AC-interference corrosion is detected in less than four years after the pipeline is put into operation.

Inductive AC is caused by interaction between buried pipeline and alternating magnetic fields generated by the flow of AC current in overhead power lines where the pipeline shares a common right-of-way with one or more overhead power lines. When a buried pipeline is parallel or crosses over high voltage overhead transmission power line (HVTL), the flow of alternating current in power line generates an alternating magnetic field in air and soil surrounding the power lines.

Raychem RPG has taken a lead position in developing industry standards and evaluation procedures in AC mitigation. As a total solutions provider, we have the capability to meet AC safety and corrosion control needs.

We design and install interference mitigation system for rectification of such problems.

Overseas Business

We have executing CP Projects worth millions of US Dollars in North Africa, Qatar, Tanzania, UAE and East Asia providing CP to pipelines, storage tanks, poles, well heads, etc. Our clients include prestigious national oil and public sector companies like Qatar Petroleum, Songas Tanzania, SWCC Saudi Arabia and China Petroleum Pipeline Engineering.

Our services include:

- Soil resistivity, Site Survey
- Shipping and Transportation
- Engineering Design
- Installation Supervision
- Equipment / Material design, manufacturing, test, inspection and supply
- Commissioning

We are approved vendors for KOC- Kuwait, Petroleum Development Oman (PDO) and ESB Energy Innovation, Ireland.
Raychem RPG manufactures the following products:

- Transformer Rectifier Units for CP
- High Current Rectifiers
- Industrial Battery Chargers
- Switch Mode Power Supply (SMPS)

Raychem RPG has a large and well-equipped unit with in-house capability for design, manufacture, and testing critical components like transformers, rectifier stacks, control PCBs, etc.

**Transformer Rectifier (TR) Units for Cathodic Protection**

Raychem RPG has executed over 2500 Automatic and over 500 Manually Controlled CP Rectifier Units in India and overseas.

- TR Units with Ultra-fast Auto Control
- Multi-reference Feedback Units with fully solid state
- 3-Way Instantaneous Automatic Reference Selector Logic Module providing CP to pipelines affected by stray currents

**Product Type:**

- AC operated TR Unit
- DC operated CPPSM Unit
- AC/DC operated TR Unit
- TR Unit for Hazardous Area Operations

**High Current Rectifiers**

- High Current Rectifier is designed with Variac Controlled configuration and Thyristor controlled configuration (primary controlled / secondary controlled)
- Processes deploying these rectifiers are Chlorination, Electro-plating, Electrolysis, Hydrogenation, Electro-cleaning, Electro-winning, Electro-slag, etc.
- Product in Single Phase/Three Phase AC Supply with O/P Supply upto 400V DC and 10,000 A-DC

**Industrial Battery Chargers**

- Manufactured in different configuration, viz: Float cum Boost (FCBC), Float and Boost (FC & BC), Dual Float cum Boost (DFCBC)
- Single Phase / Three Phase AC Supply with O/P Supply upto 360V DC and 3,000 A-DC

**Switch Mode Power Supply (SMPS)**

- Input Supply - Single Phase Output Supply - upto 1 KW, ensures high efficiency and close to unity power factor

**New Developments**

- High current solid state Rectifier Unit of rating 10V/10000A for electroplating application
- Thyristor controlled Reversible Rectifier Unit of rating ±40V/3600A for Electro-cleaning application
- 16KV high voltage rectifier
- Flame proof TR certified by CMRL, Dhanbad
PIPELINE FIELD JOINT COATING

Products

Pipeline Field Joint Coatings - Covalence Brand

HTLP® wrap-around Sleeve & Epoxy System
Compatible Line Coating: 3 LPE/ CTE/ FBE/ 3LPP
Standard: EN 12068, DIN 30672, ISO-21809 Part-3

The most widely used girth weld protection system for three-layer coated pipes
Construction: Three layer system
First Layer: Liquid Epoxy, solvent free two-components
Second Layer: High shear strength co-polymer adhesive
Third Layer: Radiation cross-linked high density polyethylene or polypropylene

HTLP® System is a wrap-around heat shrink sleeve which replicates the structure and performance of Mill-applied three layer PE/PP coatings.
By far, majority of girth welds used worldwide on three layer coated pipes, diameters up to 100” (Dn2500), have been coated with HTLP®.

DIRAX® wrap-around Sleeve & Epoxy System for HDD crossings
Standard: EN 12068, DIN 30672, ISO-21809 Part-3

High performance fiber glass reinforced sleeve specially designed for girth weld corrosion protection on pipes used in directional drilling applications.
Construction: Three layer system
First Layer: Liquid Epoxy, solvent free two-components
Second Layer: High shear strength co-polymer adhesive
Third Layer: Thick, fiberglass reinforced, radiation cross-linked polyethylene

WPC® two layer heat shrinkable sleeves

Field joint coating of water pipelines and offshore oil and gas pipelines
Construction: Three layer system
First Layer: Visco-elastic adhesive sealant
Second Layer: Radiation cross-linked, high density polyethylene
• WPC®-T
• WPC®-65M
• WPC®-100M

Note: COVALENCE®, POLYKEN® & POWERCRETE® are brands of Berry Plastics, CPG, USA.
® is the Registered Trademark of Berry Plastics, CPG, USA.
Pipeline Crossing Materials

CSEM® CASEAL (US) wrap-around pipeline casing seal
Compatible Line Coating: PE/PP/FBE/CTE
Standard: EN 12068, DIN 30672

Heat shrinkable sleeve providing waterproof seal between casing and carrier pipe

Construction: Two layer system
First Layer: Visco-elastic mastic sealant
Second Layer: Fiber glass reinforced, radiation cross-linked polyethylene backing
Additional kit: Non-shrinkable polypropylene support sheet

Casing Insulators
Size range: Pipe dia ranging from 2” to 48”
Casing insulators are used to install and support carrier pipe inside the casing pipe and isolate electrically the casing and carrier pipes. Approved by Petronas.

Product Features/ Benefits
• High electrical insulation
• Low water absorption
• High compressive strength to support carrier pipe weight
• Does not soften or flow at design to temperatures

Polyken® - 942/955
3 ply/ 2 ply cold applied tapes

Product Applications
• Plant Piping
• Rehabilitation - Oil and Gas
• New construction - Oil and Gas
Products

POLYKEN® - 980/955
2 ply/2 ply cold applied tapes

Product Applications
• Plant Piping
• Rehabilitation - Oil and Gas
• New construction - Oil and Gas

YGIII
Multilayer cold applied tape system

Product Applications
• New Construction - Water

Pipeline Coating - Liquid Epoxy - Powercrete Brand

External Coating

R95®, R150®
100% solid, high build epoxy novolac that coats, repairs and rehabilitates pipeline operating at maximum temperature up to 95 °C (203 °F), 150 °C (302 °F) respectively

Product Applications
• Bare steel structure in need of protection
• Pipeline repair and rehabilitation
• Girth welds/field joints
• Directional drilling
• Offshore risers, spars and piles, pipe bends, fittings, valves and odd shapes

Internal Coating

PWA®
PWA® is a BS-6920/WRC, UK approved liquid epoxy polymer coating designed for use as pipe lining for potable and waste water pipes and storage tanks.

Note: COVALENCE®, POLYKEN® & POWERCRETE® are brands of Berry Plastics, CPG, USA.
® is the Registered Trademark of Berry Plastics, CPG, USA.
Other Pipeline Products/Accessories

**HDPE Sheet**
- HDPE based sheet with dimensions 1 mtr (width) x 3 mtr (length) x 6 mm (thick)
- Used during interference of underground pipelines with above ground running High Tension wire
- Protects pipelines from electromagnetic field interference and pipeline corrosion (due to effect of EMF with CP)

**ROCKSHIELD**
Rockshield is a flexible padding consisting of tough high density polyethylene mesh designed especially for protection of corrosion coating in rocky backfill conditions. It provides protection needed for pipeline coating without blocking the cathodic protection system.

**Product Description**
- Unique flat surface will not mar the soft coating
- It is designed for application over coal tar or asphalt enamel coated pipe as well as FBE tape and extruded PE coatings

**Product/Features/Benefits**
- Reduces impact and penetration damage
- Reduces the need for select backfill and padding
- Flexible over a wide range of temperatures
- Unique flat sided design will not damage primary coating system

**R-MAT**
Raychem warning mat/tape is manufactured from high impact virgin polyethylene, LDPE, HDPE, and PVC materials. Warning mats are manufactured as per customer specification in various sizes and colors, in any text or language.

**Product Features**
- Anti-rodent and non anti-rodent grades available
- Non deletable, scratch-proof and u/v resistant printing available
- High impact resistant
- High tensile strength
- High quality material: HDPE, LDPE, LLDPE, PVC
- Thickness ranging from 0.1mm to 1.5mm

**Protection Mesh**
- HDPE based mesh with aperture size 5mm x 5mm and thickness of 8mm
- Recommended and used for protecting MDPE pipelines in rocky terrain against damage
- First of its kind pilot project. The specifications were first laid down by JP Kenney (Wood Group India) for City Gas.
- Approved by JP Kenney
CORONA M is a multi-jet velocity type water meter used for measuring cold water. The meter is developed in technical collaboration with Sappel, France having several years of experience in water metering business.

CORONA M multi-jet meter uses magnetic transmission. It is a proven technology, combining good quality metrology properties (80 equivalent Class B) and great endurance particularly with charged water. Magnetic transmission keeps the register separated from the hydraulic part.

The water meter is manufactured from highest quality material for maximum resistance to wear and tear by keeping the turbine balanced, thus assuring stable metrological performance.

Salient Features

A. Body
- Finish – Powder Coated (blue)
- Allows non-return valve installation, if required
- Different thread connections (optional)

B. Register
- Super dry and hermetically sealed register, complying to IP 68 Standard
- Modular register (pre-equipped for IZAR Radio)
- Orientation 0:355° to ensure easy reading from any direction
- Magnetic transmission
- Anti-fraud indication allowing tampering detection

C. Metrology
- Metrological Class R = 80 as per new European legislation (MID) and conforming to ISO 4064 Standard
- Better endurance

D. Approvals
CORONA M Water Meters are approved by:
- EEC (European Economic Community)
- FCRI (Fluid Control Research Institute)
- OIML (International Organization of Legal Metrology)
- MID (Measuring Instrument Directive)
AMR System
Pioneering in the area of radio reading of meters, Sappel designed and launched the Izar Radio System in 1997.
GAS METER

Meter Dimensions

Domestic Gas Flow Meter

- Model type: G 1.6 Diaphragm
- Standard: BS EN 1359
- Pipe distance: 110 mm
- Casework: Steel / Aluminium
- P_{max}: 0.20 bar / 0.5 bar
- Max flow: 2.50 m³/hr
- Min flow: 0.016 m³/hr

- Cyclic volume: 0.52 dm³
- Operating temperature: -20°C + 60°C
- Finish: Powder coated
- Color: Beige
- Max index reading: 99999.999 m³
- Net weight: 1.88 kg
- Connections: ¾” BSP / NPT / BS 746
  (Other connection available on request)
Product Features:
- Index is compatible for implementing automatic meter reading system for remote reading and data management
- Corrosion resistant powder coated (inside and outside) steel casing
- UV stabilized Index Casing
- In-built reverse count restrictor
- Designed for long term, accurate and reliable reading
- Flange is sealed by band to prevent unauthorized dismantling
- Pressure test point at outlet of meter (optional)

Commercial Gas Flow Meters
Range Available: G2.5, G4, G6, G10, G16, G25, G40, G65, G100
Pre-Paid Gas Meter

A pre-paid gas meter is a gas meter with additional Electronic Control Unit (ECU) on the traditional diaphragm type gas meter, realizing digital and intelligent management of gas measurement. It adopts high quality diaphragm gas meter as its base meter which is manufactured in compliance with IS 14439-1 & 11 / BS EN 1359:1999 Standards.

The key components of the meter are made of intensified special material with world’s advance production level and best test lab equipments. Mechanical meters have reformed the traditional supply of gas, generation of bills for gas consumed and collection of payment against gas supplied. Prepaid gas meters with modernization, safety, reliability performances and modern management characteristics ensure the benefits of supply and demand are not violated and revenues are intact.

Hand Held Device for Prepaid Meters

A portable hand held device for prepaid meters is available which can perform functions like “create new customers”, “recharge customer card”, “reverse the charge”, “check tampers” and is attached with a printer used for printing transaction records for the consumer. The printing module is a thermal printer and has the facility to automatic feed and cut printed paper. The printer is connected with microcontroller through USART serial communication protocol to store customer records. It can store at a time data upto 500 customers.

Pre-paid System consists of:
- Basic mechanical gas meter with internal or external motorized valve
- IC Cards (Management Cards for distribution office, User Card for consumer)
- IC Card reader-writer
- Software

### Commercial Gas Flow Meter Table

<table>
<thead>
<tr>
<th>Type</th>
<th>G2.5</th>
<th>G4</th>
<th>G6</th>
<th>G10</th>
<th>G16</th>
<th>G25</th>
<th>G40</th>
<th>G65</th>
<th>G100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Diameter</td>
<td>mm</td>
<td>20/25</td>
<td>20/25/32</td>
<td>25</td>
<td>40</td>
<td>40</td>
<td>50</td>
<td>80</td>
<td>100</td>
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<tr>
<td>Connection Size</td>
<td>mm</td>
<td>1”/1”</td>
<td>1”/1”</td>
<td>1”/1”</td>
<td>1”/2”</td>
<td>1”/2”</td>
<td>2”</td>
<td>2”</td>
<td>2”</td>
</tr>
<tr>
<td>Capacity / Flow Rates</td>
<td>m³/hr</td>
<td>0.025</td>
<td>0.04</td>
<td>0.06</td>
<td>0.1</td>
<td>0.16</td>
<td>0.25</td>
<td>0.4</td>
<td>0.65</td>
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<tr>
<td>Q max-m³/hr</td>
<td>m³/hr</td>
<td>4</td>
<td>6</td>
<td>10</td>
<td>16</td>
<td>25</td>
<td>40</td>
<td>65</td>
<td>100</td>
</tr>
<tr>
<td>Cyclic Volume</td>
<td>cm³</td>
<td>1.2</td>
<td>2.4 (2.0)</td>
<td>3.5</td>
<td>6</td>
<td>6</td>
<td>12</td>
<td>30</td>
<td>60</td>
</tr>
<tr>
<td>Pressure Max. Bar</td>
<td>mbar</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>Pressure Loss</td>
<td>mbar</td>
<td>&lt;2.0</td>
<td>&lt;2.0</td>
<td>&lt;2.0</td>
<td>&lt;3.0</td>
<td>&lt;3.0</td>
<td>&lt;3.0</td>
<td>&lt;3.0</td>
<td>&lt;3.0</td>
</tr>
<tr>
<td>Pipe Distance</td>
<td>mm</td>
<td>110</td>
<td>250</td>
<td>250</td>
<td>280</td>
<td>335</td>
<td>510</td>
<td>640</td>
<td>710</td>
</tr>
</tbody>
</table>
Regulator

Gas Pressure Regulator, commonly known as “Meter Regulator”, is used mainly for household / residential / domestic purpose. The Regulator is suitable for both natural gas, as well as, LPG. The main purpose of the regulator is to supply gas at constant set outlet pressure.

Raychem RPG Regulator meets the current standards. It uses well-proven principles of control dynamics, together with modern assembly techniques, to produce a regulator that offers excellent performance in a compact, low cost and maintenance free unit.

The Regulator is supplied with both inlet and outlet standard female threaded connection of size ¾” x ¾” suitable for BSP, BSPT and NPT connections.

Raychem RPG has a state-of-art ‘Fully Automatic’ testing facility, eliminating the need of human interference. The Test facility meets the needs of T/SP/PRS/3, EN86 and EN334 Standards.

The outlet pressure is set in the factory at 21.8 mbar and can easily be adjusted, if necessary, upto 28 mbar as per client requirement. The inlet pressure for the meter regulator is 100-110 mbar.

Turbine Meter

Vemm Tec IGTM (International Gas Turbine Meter) is a highly accurate flow meter, approved for custody transfer measurement, equipped with electronic pulse outputs and mechanical counter. IGTM gas turbine meter ranges from 50 mm (2") to 400 mm (16"). It is specifically designed in accordance with all relevant and published standards like EC directives, EN 12261, AGA 7, ISO 9951, OIML R6, R32, and R137-1. IGTM-CT meter is approved for custody transfer in all EC (European Community) countries. These meters are approved by Engineers India Limited, India for Custody Transfer applications and GAIL.

Some of our clients include GAIL India, Assam Gas, Bhagyanagar Gas, Forbes Marshall, Nirmal Industries, Chemtrols Industries, Control Plus, etc.
Electronic Volume Converter
PTZ-BOX 3.0 is an electronic converter for gas volume meters (for custody transfer) with extended features
- LF or HF single / dual pulse input or encoder
- Includes sensors, pressure sensor internally or externally mounted
- Additional pressure or temperature sensor optionally available
- 4-User configurable Quick Access Buttons for direct access to important values, etc.

PTZ-BOX 3.0 is equipped with 128 x 64 pixels and back light display. It is operated by 10 buttons on the front panel. The equipment is battery powered or optionally, line powered volume converter for gas measurement applications. Applications are with gas flow meters providing LF/HF pulse or encoder signals.

Rotary Positive Displacement Meter
OMEGA VI rotary gas meter is a positive displacement meter for volume and flow rate measurement. The metering principle of OMEGA VI is displacement of the metering chamber content by two special shaped rotors. It is suited for measuring clean, dry, non-corrosive gases like natural gas, propane, butane, air, nitrogen and others. The meter is used for highly accurate gas measurement where a large rangeability is required. The meter measures quantity of a flowing gas at actual gas pressure and temperature, i.e. at flowing conditions.

Approvals for Gas Meters & Regulators
HEAT TRACING

Applications

Raychem RPG provides Temperature Maintenance Solutions for Fluid / Material handling problems, at a fraction of cost over achieved benefits. To meet the challenging needs of the industries, we offer Heat Tracing Systems, be it electric or steam.

### TEMPERATURE BANDS

<table>
<thead>
<tr>
<th>Heat Tracing Applications</th>
<th>Temperature Band</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 0°C Freezing</td>
<td>100-119°C Boiling</td>
</tr>
<tr>
<td>25-50°C Warming</td>
<td>120-150°C High</td>
</tr>
<tr>
<td>60-99°C Hot</td>
<td>&gt; 190°C Very High</td>
</tr>
<tr>
<td>Water</td>
<td>Steam</td>
</tr>
</tbody>
</table>

### CLASSIFICATION

<table>
<thead>
<tr>
<th>Heat Tracing Applications</th>
<th>Temperature Band</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freezing Protection</td>
<td>Reduce Viscosity</td>
</tr>
<tr>
<td>Prevent Condensation</td>
<td>Prevent Bacteria Growth</td>
</tr>
<tr>
<td>Prevent Crystalization</td>
<td>Temperature Sensitive Fluids</td>
</tr>
<tr>
<td>Prevent Solidification</td>
<td>Special Application</td>
</tr>
</tbody>
</table>

### Fluids that are Heat Traced

- Furnace & Heavy Fuel Oils
- LSHS & HHS Fuel Oils
- Naphtha
- Carbon Black Feed Stock
- Black Liquor
- Lube Oil Additives
- Coal Tars & Bitumen
- Hydrogenated Oils
- Coconut & Palm Oils
- Glucose
- Fertilizer Slurries
- Fatty Acids
- Acetic Acids
- Sulphur
- Inorganic Chemical Crystals
- Methylene Diphenyl (MDI)
- Hydrocarbon Gases
- Latex
- Glue
- Hot & Distilled Water
- Stack Emission Gases
- Hopper-Hygroscopic Materials
- Methanol
- AOS Paste
- Rosin
- Molasses
- Caustic Soda
- Wax
Applications

![Diagram of heat tracing systems and materials](image)

**Heat Tracing**

**Applications**
- Raychem Self-Regulating Systems
- Conventional Heating Cables

**Rapid Startup**
- Energy Savings
- Power Output

**Temperature**
- Constant Wattage
- Resistance

**Asphalt Sulfur**
- Mineral Insulated-MI
- Power Limiting-VPL

**Fuel Oil**
- Self-Regulating Conductive Fiber
- Fiber-XTV

**Caustic Soda**
- Water
- Self-Regulating Monolithic BTV, QTV

**Water Treatment**
- Refining Utilities
- Food Pulp and Paper, Chemicals
- Primary Metals

**Exposure Temperature**
- Copper bus wire
- Self-regulating conductive core heating element
- Insulating jacket
- Braided tin-copper shield and outer jacket

**Raychem Conductive-Polymer Heaters**

**XTV Heating Cables**
- Feature a fiber-wrap construction that can easily be cut back for power connection and termination.

**Cold Pipes**
- In response to cold, the core of fiber contracts microscopically opening up electrical paths.

**Warm Pipes**
- In response to warmth, the core of fiber begins to expand microscopically disrupting the electrical paths.

**Hot Pipes**
- The core of fiber expands enough to disrupt almost all of the electrical paths.
Innovative Conductive Polymer self-regulating technology works in both, monolithic (solid core) and fibre wrap electric heat tracers.

Self-Regulating Tracers provide and control heat at every point along the pipeline temperature profile, where and when needed, thus self-stabilizing within the required fluid temperature limits, under no flow condition which no other type of temperature controls can ever match.
FLUID STORAGE AND HANDLING SYSTEMS

Storage and handling of expensive fluids which are temperature sensitive, explosive, viscous, high pour point and/or corrosive requires holistic care to prevent corrosion, leakages, congealing and loss of heat. Raychem RPG provides just that kind of care in design, engineering, automation, electric power distribution, instrumentation, corrosion protection, monitoring and control, erection and maintenance for fluid storage and handling installation. This is further supported by specialization in technologies of conductive polymer anodes and self-regulating electric surface heaters, self-sealing adhesives and sealants for protection of thermal insulation on tank and pipe surfaces.

Raychem RPG provides this unique service to industries for areas of plant that deserve utmost care.
Raychem RPG Polymeric Thermal Insulation covering protects tank and pipe insulation against damage from moisture, as well as acids, bases and most solvents. The Exterior is rugged enough to resist tampering and mechanical abuse, yet flexible enough to wrap easily around awkward shapes.
Products


**Self Regulating Cables**
the preferred choice for the most complex pipe tracing application

- **BTV** is suitable to maintain temperature up to 65°C and can withstand up to 85°C.

- **QTVR** is suitable to maintain and withstand temperature up to 11°C.

- **XTV & KTV** fibre core cables can maintain temperature up to 121°C & 150°C, respectively. These tracers can withstand temperature up to 250°C in power off condition.

**Power Limiting Cables**
for application exceeding the temperature range of self-regulating cable

- **Raychem VPL** heating cable maintains temperature greater than 150°C and withstands continuous exposure to 250°C power off.

- **Pyrotenax MI** cable maintains temperature up to 550°C and withstand exposure to 650°C.

**Mineral Insulated Cables**
For high temperature applications

- Pre-traced, thermally insulated with extruded protective jacket, ready to install tubing bundles, with application choice of tubing material and tubing construction.
Raychem RPG offers a complete range of Electric Heat Tracers to meet the required application, along with full range of Connectors, Thermostats and Accessories available with worldwide hazardous area usage approvals such as BASEEFA, LCIE, PTE, FM, UL, CCA, CCDE and CMRI of India.

Heat Tracing System

A complete electrical heat-tracing system is much more than just the heating cable. We can provide a complete system from electrical transformer and heat tracer panel to power connection, heating cable, end termination, glass tape and warning labels.

Raychem RPG supplies individual components, as well as, provides engineering, design, installation and maintenance of the entire system.
Electric Heaters

Raychem Immersion and Outflow Heaters are most suitable for storage tanks of oils, chemicals and any contents for raising the temperature. These heaters are best alternative to tubular immersion heaters. The system is designed in such a way that whenever a heater is required to be replaced, it is not necessary to remove the contents from the tank.

These heaters are made with different wattages and sizes. They are made of MS, SS304, SS316, SS316L and as per customers' choice.

The ceramic heaters being inserted in the seamless tubes are made with high quality material (Nichrome 80/20 wire).

Companies using Nicropad Heaters are:
Apollo Industries, Munjal Auto Industries, Gujarat Ambuja Exports, Hotline Glass Industries, Haldyn Glass Industries, Bharat Udyog, Berger Paints, Shalimar Paints, Maharani Paints, Endurance Technologies, Hindustan Zinc, etc.
Awards & Accolades

TPM Excellence Award
JIPM - 2011

RPG Organizational Excellence Awards & Merits

Silver Certificate of Merit
India Manufacturing Excellence
IMEA Awards 2011

Certificate of Merit - Plastic Sector
National Energy Conservation Awards
Ministry of Power
2011

Certificate of Commendation
CII-EXIM Awards
2001 & 2003

RPG Best Corporate Performance
1993 & 2002

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