Water Technologies

for Automotive and Metal Finishing Industry
Automotive

Automotive assembly, truck, heavy equipment as well as tier I, II and III component suppliers.

Primary Metals and Mining

Steel and precious metal producers, including secondary production including, tube, slab, wire etc. Mining and milling operations.

Metal Finishing and Manufacturing

Plating operations, printed circuit boards, appliances, etc. including aerospace.
Market Definition

Primary Metals
- Steel industry
- Aluminum
- Mining

Automotive
- Assemblers
- Machinery
- Component suppliers
- Heavy truck
- Other vehicles

Metal Finishing
- Plating
- Aerospace
- Appliances
- Shipbuilding
- Metals manufacturing

Similar Technologies
- Reverse Osmosis
- Clarifiers/Thickeners
- Biological Systems

Similar Manufacturing Processes
- Painting car
- Painting appliance
- Painting beer ban

Similar Waste Streams
- Metals
- Organics

Similar Water Requirements
- High purity rinses
- Cooling water

BINDING ELEMENTS
Automotive Applications
It Takes Nearly 40,000 Gallons of Water To Produce a Single Vehicle, and Siemens Products and Services touch almost every drop along the way.
Grow Siemens Water Technologies sales and profits in the metals and manufacturing industries by delivering superior customer service and single source technical solutions. To accomplish mission, we will:

Integrate all of the products, services, and marketing that Siemens Water Technologies has to offer the metals and manufacturing industries into an easy to access and use resource for our internal and external customers.

Educate Siemens employees that serve the metals and manufacturing industry on our key customers and their requirements.

Act as the conduit between the customer, Siemens Water Technologies internal organization (sales, manufacturing and service business center and R&D), other Siemens entities and external organizations.
Siemens Water Technologies and the Steel Industry

Siemens provides the complete portfolio of water treatment technologies for the steel Industry.

- Our focus is on technology not equipment.
- Solution based not equipment based.
- Process Integration
- Selecting the proper materials of construction for the working environment.
Applications and Technologies

**Plant and Process water**
- Intake screens, Membrane Filtration, Reverse Osmosis

**Zero Liquid Discharge (ZLD)**
- Multiple integrated technologies including biological, Membrane filtration and reverse osmosis.

**Rinse Water Recovery and Reuse**
- Micro Filtration and Reverse Osmosis

**Cooling tower blow down recovery and recycle**
- Micro Filtration Membrane Softening

**Coking Wastewater treatment**
- Integrated Technologies including Dissolved Air Flotation and Biological treatment

**Difficult to treat organic waste streams**
- PACT and Wet Air Oxidation

**Reverse Osmosis Brine Recovery**
- Micro Filtration Membrane Softening
From the Thousands of Component Manufacturer’s

Water Technologies

Slide 10

Slide 10
Water Technologies

To Engine and Transmission Plants

1. **Incoming raw/unfinished material**
   - Machining
   - Parts washers
   - Plating lines

2. **Source water**
   - Treatment
   - RO or DI or RO/CDI® or SDI

3. **Incoming plant water treatment**
   - Precipitation Clarifier
   - Memtek® microfiltration

4. **Metals-laden wastewater from parts machining and finishing operations**

5. **Oily wastes from spent coolants and machining fluids**
   - DAF
   - Batch chemical treatment
   - Oil/water separation

Silverback™ MF cleaner recyclate
Assembly Plant Process and Wastewater

2. Assembly Plants

- Plant Water
- Reverse Osmosis
- Deionization
- CDI
- Surface Finishing and Painting Applications
- Cleaner Recovery Membralox®
- Rinse Water Recovery
- Zinc Phosphate
- Microfiltration
- Recovery Services
- Closed-loop Deionization
- Ultrafiltration/RO

3. Wastewater Treatment Metals

- Metals Treatment
  - Circular Clarifiers
  - Plate Separators

- Biological Treatment
  - Activated Sludge
  - RBC
  - SBR
  - MBR
  - PACT
  - Fluidized Bed

Clarifier

Filter Press
And Finally Water Recycle

Wastewater Recycle

Water for Reuse

Solids for Disposal

Microfiltration Silica Removal and Softening

Reverse Osmosis

Evaporator Crystallizer

Dry Solids

Wastewater Treatment

Reverse Osmosis

Media Filtration Microfiltration

Concentrate

Filter Press

Plant

Water for Reuse
Siemens is the leading supplier of high purity water treatment systems, wastewater treatment equipment and services into the Automotive industry.

Our extensive engineering support to the key automotive paint line providers coupled with local support capabilities has enabled Siemens to provide over 75% of the Assembly plants in North America alone with their high purity water requirements. Local Branch offices offering prompt professional services differentiates Siemens from equipment only suppliers.
In the last 10 years, zero discharge systems have become common practice for automotive assembly plants in areas where water resources are both scarce and expensive.

Siemens leads the way in developing integrated systems to meet these requirements including prominent installations at Chrysler Saltillo Mexico (first assembly plant zero discharge facility) and General Motors Ramos Arizpe Mexico (winner of the prestigious Stockholm Industrial Water Award in 2001).
Typical Zero Liquid Discharge

**Water Technologies**

- Microfiltration for suspended solids removal
- Biological Treatment
  - Note: This system may be modified to MBR and eliminate the next stage microfiltration system.
  - Heavy metals removal with solids contact clarifier

- Free oils and tar removal with DAF

- Reverse osmosis for water reuse
  - Reverse osmosis concentrate sent for further treatment
  - Permeate back to facility for reuse

- Microfiltration for suspended solids removal

- Reverse osmosis for water reuse
  - Reverse osmosis for water reuse

- Heavy metals removal with solids contact clarifier

- Typical Zero Liquid Discharge
  - Permeate back to facility for reuse
  - Reverse osmosis for water reuse

- Microfiltration for suspended solids removal
Typical Zero Liquid Discharge (cont.)

- Reverse osmosis concentrate from first stage RO containing high TDS, silica and hardness
- Membrane softening
- Microfiltration system
- Batch Tank
- Filter press for solids disposal
- Permeate back to facility for reuse
- 2nd stage reverse osmosis
- Reverse osmosis concentrate sent for further treatment
- Solids for disposal
- Crystallizer
The treatment of coking waste is the most difficult within the steel making process. The complex organic and inorganic contaminants combined with the extreme temperature of the waste stream require an integrated system including a number of technologies.

Oils and metals are removed through settling or Dissolved Air Floatation.

Various biological treatment technologies may be utilized for final treatment of organic wastes. This could include typical activated sludge, or PACT depending on the levels of contaminants and the discharge regulations.

Siemens WT has been involved in five of the last six coke plant wastewater treatment systems built in the world. This experience includes some or all of the following at each site: design, equipment selection and procurement, construction and start-up.

Available contract engineers are the foremost experts in the world on coke wastewater treatment.
Coking Wastewater Treatment Example

- Wastewater from Distillation Process
  - High in BOD/COD, Phenols, Mercury, Ammonia and cyanide.

- Biological treatment or potential PACT® treatment system depending on discharge regulations

- Free oils, tar and mercury removal with DAF

- Solids removal with solids contact clarifier

- Solids dewatering

- Discharge
Cooling Tower Blow Down or Reverse Osmosis Brine Recovery

- Cooling tower blow down or first stage RO concentrate
  - RO Concentrate
    - High Hardness
    - High Silica
    - High TDS
  - Membrane softening
  - Dry solids for disposal
  - Permeate
  - Water for reuse
  - Concentrate
  - Discharge or further treatment with crystallizer
  - Reverse osmosis
Daimler Chrysler – Newark, Delaware

**Facility Type:** Assembly Plant

**Type of Project:** Equipment Install.

**Process:** High-purity water for E-coat and assembly line paint applications

**Goals:** Provide high-purity water with low TDS and silica

Reduce labor costs

Eliminate regeneration chemicals costs and handling
Daimler Chrysler – Newark, Delaware

Plant Water

Booster Pumps → Duplex Multimedia Filters → Duplex Carbon Filters

15,000 gallon storage tank

UV Lamp → Duplex Booster Pumps

2 Parallel 100 gpm RO Systems

Chemical Injection Acid & Antiscalant

4.0 micromhos water
**Facility Type:** Assembly Plant  
**Type of Project:** Installation, Equipment Supply  
**Process:** High-purity water for E-coat and assembly line paint applications  
**Feed Water:** Treated well water source high in TDS & silica  
**Goals:**  
- Provide high-purity water with low TDS and silica  
- Reduce labor cost (no regeneration and less service)  
- Eliminate regeneration chemicals cost and handling
City Water → Duplex Multimedia → Duplex Carbon → Duplex Softener

120 gpm to paint line

→ CDI → Reverse Osmosis System
Industrial Process
- Automobile assembly plant (painting, stamping, machining)
- Wastestream: end of pipe wastewater

Contaminants
- Heavy Metals
- Organics
- Oil & Grease
- TDS

Technologies
- Heavy metals removal
- Biological
- Clarification
- Chlorination
- Multi Media
- RO

Drivers
- Environmental Regulations
- Water availability
Daimler Chrysler Saltillo, Mexico

Well Water → Multi-media Filters → Reverse Osmosis

Water Technologies

Wastewater
Daimler Chrysler – Saltillo, Mexico

Water Technologies

Factory

Permeate for reuse

Concentrate

Evaporation Ponds

Heavy Metals Removal

Clarifier

Chlorination

Clarifier

Reversed Osmosis

Chlorination

Suspended Solids Removal

for reuse

Daimler Chrysler – Saltillo, Mexico

Water Technologies

Factory

Permeate for reuse

Concentrate

Evaporation Ponds

Heavy Metals Removal

Clarifier

Chlorination

Clarifier

Reversed Osmosis

Chlorination

Suspended Solids Removal

for reuse
Phosphate Rinse Water Recovery

Wastewater from phosphating processes → Equalization Tank → Concentration Tank → Reverse Osmosis System

Filter Press → Solids Disposal

Permeate Recycle back to rinse

Microfiltration System

Balance tank
Cooling Tower Blowdown, Brine Recovery, Membrane Softening

Factory

Cooling tower Blow down

RO Concentrate

Feed Water
- High Hardness
- High Silica
- High TDS

Water for reuse

Membrane Softening

Concentrate

Evaporation Ponds

Reverse Osmosis

Dry solids for disposal

Water Technologies
### Delphi - Saltillo, Mexico

<table>
<thead>
<tr>
<th><strong>Facility Type:</strong></th>
<th>Parts manufacturing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of Project:</strong></td>
<td>Design Build</td>
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<tr>
<td></td>
<td>Equipment supply</td>
</tr>
<tr>
<td></td>
<td>Operations Contract</td>
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<tr>
<td><strong>Process:</strong></td>
<td>Microfiltration for Metals Laden Waste streams</td>
</tr>
<tr>
<td></td>
<td>Ultrafiltration for Oily Wastwater</td>
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<td></td>
<td>Biologically treat high COD, BOD and Sanitary WW</td>
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**Goals:**
- Meet local discharge requirements
- Provide Seamless Supplier working with Detroit based engineering and local project management.
- Turnkey Install project and operations contract enabled the customer to focus on core manufacturing processes thus reducing the length of start-up and providing a quick turn around to full production capacity.
Water Technologies

Incoming Water

Equalization Tank

Media Filtration

First Pass RO

Low purity water applications

2nd pass RO

High purity water applications

Potable water

Storage Tank

chlorination

Delphi – Saltillo, Mexico
Delphi – Saltillo, Mexico

Water Technologies

Wastewater

metals

Equalization Tank

Batch Tank

Permeate

Discharge

Microfiltration System

Oily wastewater

Concentrate Disposal

Ultrafiltration System

Sanitary Wastewater

Activated Sludge Biological Treatment Plant

Permeate

Equalization Tank

Discharge
General Motors Global Expansion
  - Mexico
  - India

Hyundai – Kia Global Expansion
  - US
  - China
  - Eastern Europe

Toyota Global Expansion
  - US
  - Canada
  - Mexico
  - Europe

All North American based component suppliers
  - China
  - Mexico
  - India
  - Eastern Europe
Common Misconception

We have these plants in our country that use water, therefore there must be a water business!

Perceived Opportunities

Misconception based on the fact that if the facilities are in place typically they already possess the majority of water treatment equipment.

Automotive Assembly Plants
- Petroleum Refineries
- Food Processors
- Breweries

Pharmaceutical Plants
- Semi Conductor
- Pulp and Paper
- Chemical Plants

Siemens WT PRODUCTS
Automotive/Metal Finishing RC Success

- Bridgestone Firestone Monterrey
- Daimler Chrysler Saltillo Mexico
- General Motors Queretero Mexico
- Kia China
- Kia USA
Marketing Sales Tools

Brochures
- Metals and mining (in development)
- Automotive (in development)
- Specific products and applications

Technology Maps
- Automotive
- Primary Metals
- Metal Finishing

Internet Integration
- Siemens Water Technology
- Siemens Metals and Mining

Siemens Newsletters
- Automotive
- Metals and Mining
### Market Opportunity Cycles

#### TIME PERIOD

<table>
<thead>
<tr>
<th>Number Of Projects</th>
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#### Automotive Opportunity Cycles

- Circular clarifiers Envirex
- DSG Filter Press
- Reverse Osmosis
- ZLD Assembly Plants Mexico
Manufacturing and sales platforms should be based on market trends and reoccurring opportunities.

RCs should focus market research not on market size but both market size and elements influencing the market such as:

- New environmental regulations
- Trade agreements
- Government funding
- Water cost and availability
- Barriers to entry
- Does Siemens WT have a solution that can be implemented.
Our focus is on the implementation of technology and not simply providing a product. Key value provided in:

- Process Integration
- Selecting proper materials of construction
- Solution focus not, equipment sales

- Proprietary applications and Technologies
- Integrated solutions
  - Within Siemens Water Technologies
  - Within Siemens

- Integrated with Service Contract
- Multi-technology opportunities.
Key Success Factors

- Focus on existing Siemens customers with a strong “Buy Siemens” history.
- Multi-national customers looking for a global partner.
- In “early” to influence design and purchasing protocol.
- Communicate with all players early and obtain “buy-in” prior to advocating potential solution to the customer.
- Do your homework “package the opportunity for the business center”
  - Contacts
  - Competition
  - Funding
  - History
  - Strategy
  - Partners
  - Terms and Conditions
  - Road blocks and new pathways