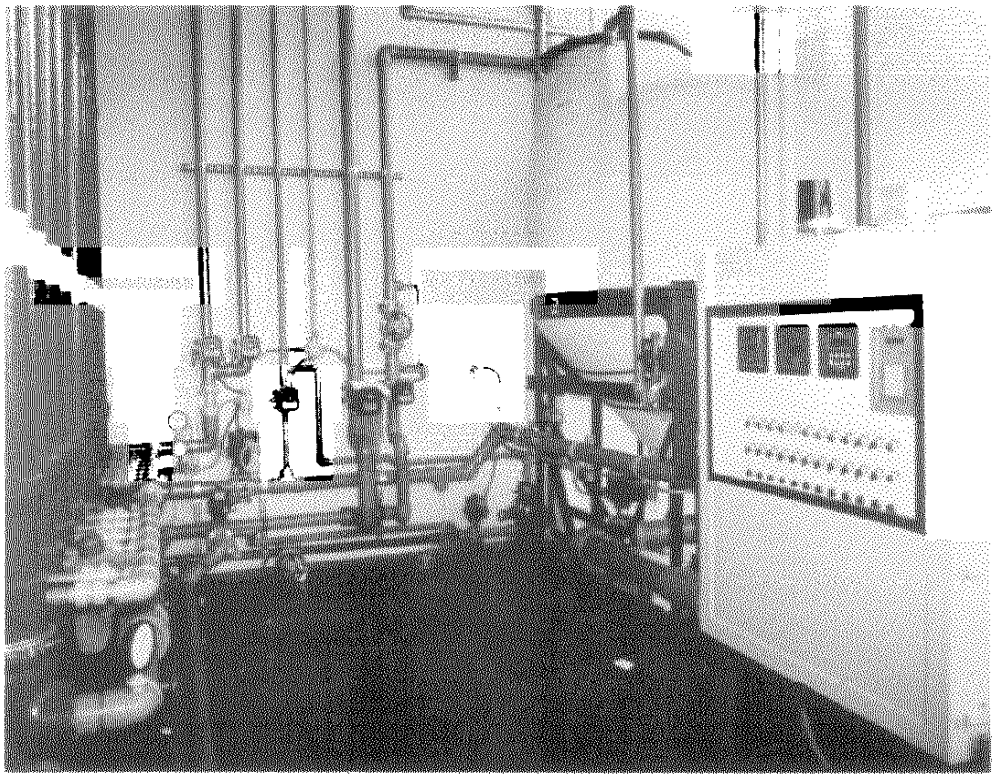
SIGNET in the Industrial Laundry Market



A Guide to the Laundry Industry and SIGNET Applications

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Cover photo courtesy of Epoc Water, Inc. and Prudential Industrial Laundry

Overview

The laundry market is an expanding market with excellent opportunities for SIGNET products. It is a large industry that exists in all regions of the country. The laundry market encompasses many different types of cleaning including laundry of uniforms with heavy oils and greases, cleaning and disinfection of medical industry garments, acid washing of blue jeans, and even babies' diapers.

The industry however has been challenged in many areas to help reduce not only its demand of water, but also to discharge less in terms of ppm of oils, greases, occasional heavy metals and solvents, and to control their effluent pH. SIGNET can provide this market with high quality, easy to use products to help them meet their goals for **water use minimization and waste water treatment compliance.**

This package will help you to understand the industry itself, and those areas where SIGNET products are used. From the front end incoming **water monitoring and conditioning**, to **waste treatment,** SIGNET products are important tools to achieve the industry's goals.

In addition to important OEM customers that build entire waste treatment systems, many specializing in oil and grease removal, there is also a need at the end user level for additional flow or pH monitoring capability and upgraded pH control systems

Geographics

The strongest geographical region of Laundry Industries appears to be in New England/Atlantic. See below·

Region	**# of Plants**
New England/Atlantic (ME, NH, VT, MA, RI, CT,NJ, NY, PA, DE, MD, WV,DC)	1,700
South (VA, NC, SC, GA, FL, AL, MS, TN, AR)	1,490
Midwest (WI, IL, IN, KY, MI, OH)	1,186
North Central (ND, SD, NE, KS, MO, IO, MN)	529
Southwest (CO, NM, TX. OK, LA)	959
Pacific (AK, WA, OR, CA, HI, MT, ID, WY, UT, NV, AZ)	1,432
Total	**7,296**

Segmentation of the Laundry Industry

The Laundry Industry, part of the expanding personal service sector, is mainly involved in laundering and dry-cleaning different items such as work uniforms or apparel as well as towels, diapers and linen. SIGNET regards the following market segments as the most significant ones:

Industrial Laundry

Industrial Laundries are primarily engaged in laundering different items which are most of the time covered by oil and grease. In order to dissolve this difficult dirt they use special methods and processes, which are described on one of the following pages. This market segment can again be subdivided into services which rent and wash the clothes (Textile Rental), and services which only wash the garments for their customers:

a) Textile Rental

Textile Rental Services supply on a rental basis laundered work uniforms, wiping towels, protective apparel (gloves, flame and heat resistant clothing) and cleanroom apparel, mats and rugs to industrial, commercial (hotels, hospitals) and government users. Establishments included in this industry may or may not operate their own laundry facility.

b) Industrial Washing Service

Industrial Washing establishments provide laundry services to industrial, commercial and government users which provide their own uniforms.

c) Linen Supply

Linen supply services are engaged in supplying, on a rental basis, such laundered items as uniforms, aprons, table linens, bed linens and towels to commercial establishments or household users. Establishments included in this industry may or may not operate their own laundry facility.

Institutional Laundries

Institutional laundries are large institutions which have an in-house laundry such as hospitals and nursing homes, hotels and motels, prisons, military bases and others.

Commercial Laundries

Commercial laundries provide laundry services to commercial and individual users.

Diaper Service

Diaper establishments are primarily engaged in providing laundered diapers. They too may or may not operate their own laundry facility

Others

Garment Finishing deals with the chemical and physical treatment of garments in order to give them a special look. Acid Washing and Stone-washing provide good opportunities for SIGNET products: Acid washing has become a very popular treatment to provide blue jeans with a pre-washed look. Stone-washing is a popular treatment for blue jeans to give them a used look.

Shows/Associations/Trade Magazines and Newspapers

Shows

The "Clean Show" (officially called the World Educational Congress for Laundering and Drycleaning) is the key show for the Laundry Industry and takes place every other year. The Clean Show most recently took place in April, 1993 in Chicago.

Associations

Institute of Industrial Launderers (Washington, DC)
International Fabricare Institute (Silver Spring, MD)
National Association of Institutional Linen Management (Richmond, KY)
Textile Care Allied Trades Association (Upper Montclair, NJ)
Textile Rental Services Association (Hallandale , FL)

Primary Trade Magazines and Newspapers Circulation

Textile Rental	6,011
Industrial Launderer	3,250
National Clothesline	39,000
Laundry News	15,050
Laundry Digest	11,400

Magazine and Newspaper Overview

Textile Rental: Circulation: 6,011
Monthly magazine. Textile Rental is the official publication of the NAILM and goes mainly to the owners and managers of the Textile Rental industry. To subscribe, call (305) 457-7555.

Industrial Launderer: Circulation: 3,250
Monthly magazine. Published by the Institute of Industrial Launderers. Its readers belong to the uniform and textile services industry. To subscribe, call (202) 296-6744.

National Clothesline: Circulation: 39,000
Monthly newspaper. 7 different regional publications serve total laundry market. To subscribe, call (215) 843-9795.

Laundry News: Circulation: 15,050
Monthly newspaper. Published by the Assoc. of Institutional Launderers, this newspaper goes to the equipment manufacturers as well as to the operators of the in-house laundries. To subscribe, call (212) 741-2095

Laundry Digest: Circulation: 11,400
Monthly magazine. Targeted to reach the entire laundry industry and delivered to laundry managers in the commercial, industrial and rental segments. To subscribe, call (312) 337-7700.

Environmental Regulations

Environmental compliance is a concern for all industrial laundry facilities. The EPA sets standards for the publicly owned treatment works (POTW) and their discharge into navigable water ways. The state and local POTW then set limits on the industries discharging to the POTW on those pollutants that could cause interference with the POTW or would exceed the EPA limits. For many industries, the federal government also sets standards specific to certain industries (called categorical pretreatment standards) which may vary based on the total volume of water discharged from the plant. At this time the Industrial Laundry industry is not subject to categorical pretreatment standards; however the EPA is currently developing these standards for final ruling in 1998.

Some examples of the current pollutants regulated by state and local POTW's include pH, temperature, ppm oil and grease, total suspended solids (TSS), volatile organic compounds (VOC), heavy metals (including zinc, lead and copper) and biological oxygen demand (BOD). is the responsibility of the industrial launderer to regularly monitor the ever changing environmental laws and the quality of their discharge to insure that their company remains in compliance.

Note: Regulatory group for the regulations shown in the chart below is the Clean Water/ Wastewater Regulatory Group.

Specific Regulation	Jurisdication	Impact	Example of Violation	Compliance Comments
General pretreatment regulations (40 CFR 403)	Federal	General prohibitions on discharging any pollutants that cause pass-through or interference with the POTW; specific prohibitions on any pollutant that could cause a fire or explosion hazard in the POTW; pH lower than 5.0; solid or viscous pollutants in amounts that could cause interference; any discharge where the temperature at the POTW would exceed 104°F.	Discharging a highly concentrated "slug" of oil and grease that causes interference at the POTW.	These prohibitions apply to every textile rental operator across the country. Significant dischargers, those discharging more than 25,000 gal./day, may be required to submit biannual effluent testing data and develop plans to respond to accidental spills and discharges.
National Pollutant Discharge Elimination System (NPDES) (40 CFR 403)	Federal and state	Any operator that discharges directly to a navigable waterway is required to obtain a NPDES permit. In other words, the discharge does not go directly to a POTW.	Any laundry wastewater or any other process wastewater such as wastewater from a truck washing station that drains in a river, lake, or stream or any ditch that leads to such a water body.	POTWs are required to have NPDES permits.
Categorical pretreatment standards	Federal	Specific industrial classifications may have additional limits placed on them.	The textile rental industry is not subject to categorical pretreatment standards at this time	EPA is developing categorical pretreatment standards for "industrial laundries". The exact definition of the term hasn't been decided. Proposed rules are due in 1996 and final rules in 1998.
POTW local limit programs	State and local	If pass-through and interference are likely to occur, POTW's are required to develop their own limits and prohibitions in order to comply with their own NPDES permit.	Discharging wastewater with a pH that exceeds the local POTW's upper pH limit.	Some POTW's allow surcharges rather than violations. Sometimes it's cheaper to pay the surcharges than install pretreatment equipment.
Storm water regulations	Federal	Several industries with specified SIC codes also are subject to storm water regulations.	Parking lot storm drains, roof drains, etc.	The textile rental industry is not subject to storm water regulations at the present time. However, that could change if the industry comes under categorical pretreatment standards. Any company can be required to obtain a storm water permit if the POTW deems it to be a significant pollutant contributor via storm water runoff.

Industrial Laundry: Textile Rental/Linen Supply

Textile Rental

The Textile Rental market represents the most significant market for SIGNET products. This market is differentiated from the others by the emphasis on **removal of oils and grease**. The oil and grease may be generated from automotive mechanics uniforms and rags, or the oil and grease used in the food service industry for frying, etc. In some instances, heavy metals and/or volatile organic compounds (sic VOC's or solvents) may also be present, and these must also be dealt with to remain in total compliance.

Types of Treatment Processes

The best process for any one specific plant will depend on its level of oils and grease, suspended solids, heavy metals and volatile organic compounds (VOC's). Some treatment processes are better at removing one or two, but do not remove all, and therefore additional pretreatment or post-treatment may be necessary. Each technology offers advantages and disadvantages and must be evaluated in terms of efficiency (how much contaminants are removed versus the cost), ease of operation, amount of chemical additives required (polymers, coagulants, acids/bases, fixers, etc.), and the amount of sludge produced for the waste that requires treatment. As the customer base grows or changes, the characteristics of the waste may also change, requiring additional treatment to be installed.

Oil and Grease Removal

There are many different ways to treat the waste washwater to remove the oils and greases before discharging. Some processes break the oil down chemically (acid cracking), others separate it using electricity (electroflocculation), while others work on the principal of improving natural separation via dissolved air floatation (DAF), or other sophisticated versions of skimming, flocculation/clarifying and/or membrane filtration. All of these processes will control their pH at some point to enable efficient operation of the system.

The traditional process for waste treatment in an industrial laundry (see Figure 3, page 11) is to first flow through a coarse screen to remove large particles, lint and other debris. An equalization tank following the coarse screen helps to hydraulically balance the flow through the system and helps to average out the level of pollutants (oil, grease, and metals), and the system pH. This is followed by separation of the oil which may occur using one of many different technologies as explained on the following pages.

Dissolved Air Flotation (DAF) is the most common process for removal of oil and grease along with suspended solids. In this process, air is injected into the solution under pressure, dissolving the air into the water. When the water then flows into the flotation unit, pressure on the water decreases, releasing bubbles that carry oil, grease and suspended solids to the top for skimming. Polymers and organic coagulants are fed into the system to improve the efficiency of the process and the overall effluent quality. The sludge from the top of the system is further processed using a rotary vacuum filter prior to disposal. pH is controlled in the equalization tank to enable the polymers to work to their optimum capacity. Final effluent pH is also monitored to ensure discharge within permitted limits. A cross section diagram of the dissolved air flotation unit and the rotary vacuum filter are shown in Figures 1 and 2. The complete process is shown in Figure 3.

Dissolved Air Flotation Unit

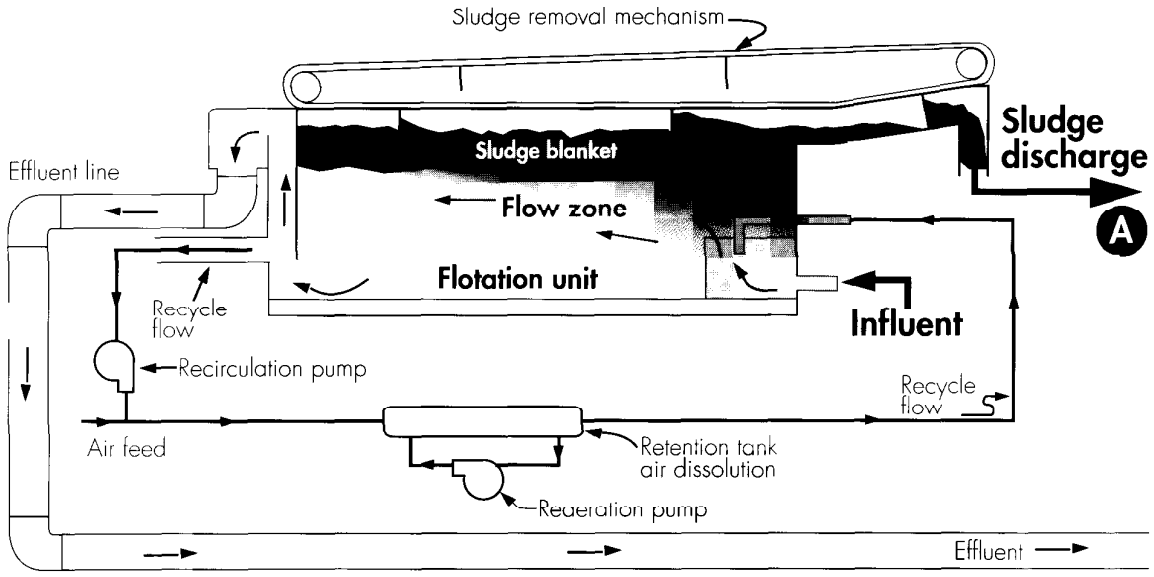


Figure 1

System Operation:

Water is pumped into the retention tank where it is pressurized with compressed air, dissolving the air into the water. Upon discharge into the flotation unit, the pressure drop causes the volume of air in the water to decrease, allowing the air to escape in tiny bubbles. The air bubbles carry the oil and suspended solids to the surface where they are skimmed off.

Rotary Vacuum Filter

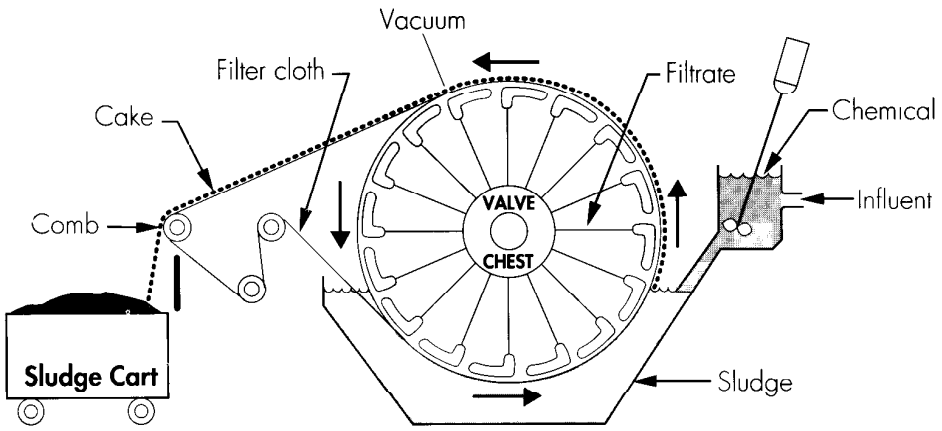


Figure 2
System Operation:
Vacuum filters are most often used to dewater sludge that is sticky in nature, especially those wastes containing oil and grease. The cylinder is covered with a cloth and rotates through a vat of sludge. A vacuum is pulled from the center of the cylinder, filtering the water through the cloth and leaving the dewatered sludge on the surface. The dewatered sludge is scraped off the cloth and into a sludge cart for proper disposal.

Oil & Grease Removal Process Using Dissolved Air Flotation Technology

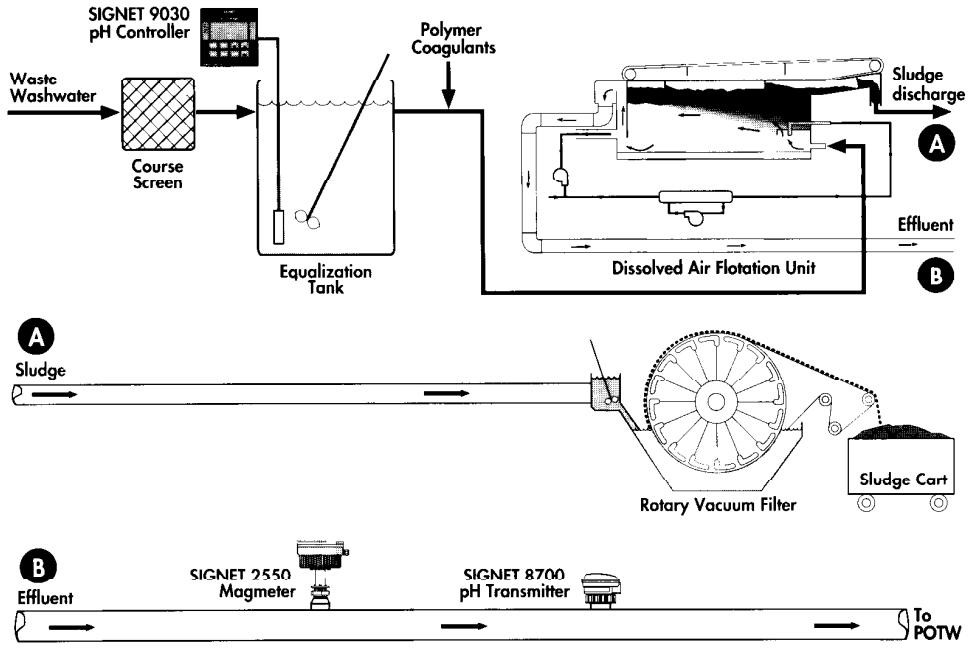


Figure 3
Treatment Process Overview:
Coarse screening
Equalization
Oil Separation
- *Dissolved Air Flotation*
- *Electroflocculation*
- *Acid cracking/coalescing*
- *Oil skimming*
- *Microfiltration*

pH Adjust
Solids Dewatering
Effluent Flow Monitoring
Effluent pH Monitoring

Electroflocculation uses a battery-like stream (see figure 4) to change the molecular structure of the contaminants After screening and equalization, the wastewater is pumped into a parallel bank of cylindrical electroflocculation reactors containing water, a corrosion resistant cathode, and special "sacrificial" anodes. The metal of the anodes are attracted by the cathode. The anode metal "dissolves" intoits ionic form, and migrates through the solution towards the cathode, producing a current flow similar to that in a battery. As the metals travel through the water towards the cathode, they react with the contaminants. Hydroxides are generated by the anodes which react with the contaminants to produce metal oxyhydroxides. These combine to form low solubility precipitates. Further addition of inorganic coagulants and organic polymer helps aid precipitation which then enables separation in a traditional clarifier. Sludge from the clarifier is further processed in a rotary vacuum filter press.

pH and flow rate into the Electroflocculation reactors is carefully monitored to enable maximum contaminant removal in the reactors. In addition, the clean water that flows from the clarifier is also monitored for pH. This process is unique in that it is capable of removing not only oil and grease, suspended solids and heavy metals, but also volatile organic compounds that would not be removed using dissolved air flotation technology.

Electroflocculation

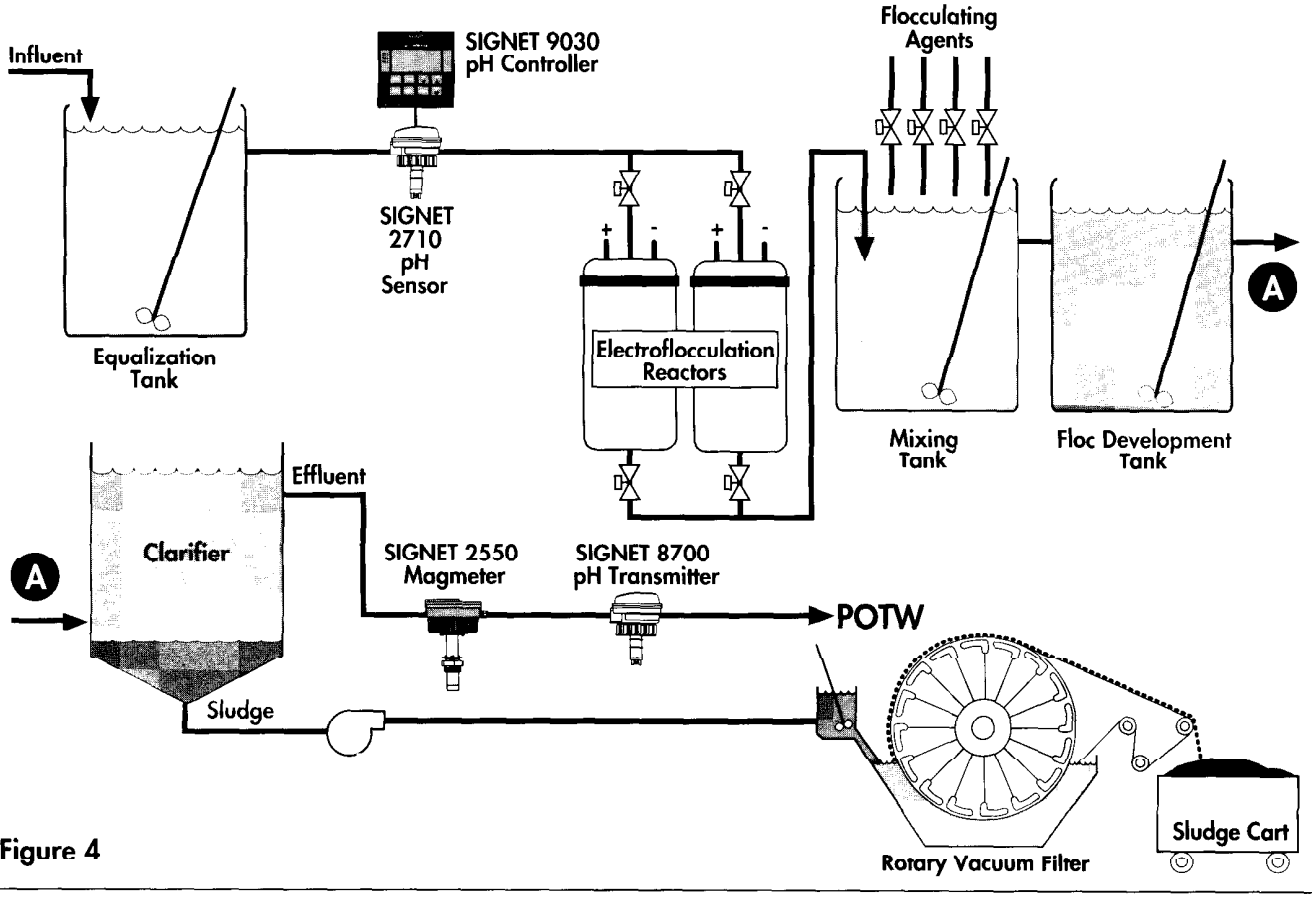


Figure 4

Acid cracking/coalescing uses pH extremes to remove oils and greases from the water. After initial screening and equalization, the water is acidified to a pH of 2 or less to break the oil and water emulsion. It then flows through coalescer packs which consist of plates made of oil-attracting materials. The oil adheres to the plates until enough volume forms that the oil can float to the top. This top layer, containing mostly oil, overflows to a decant tank where overnight settling allows further separation. The top oil layer will then contain 80 to 90% oil which can be pumped to an oil storage tank.

The water from the bottom of the coalescer pack is nearly oil free water It receives further processing to remove suspended solids, any remaining oil and any heavy metal pollutants that may exist. These common processes are described in the Linen Supply section that follows

pH control for this process is critical. The acid cracking step must be carefully maintained at a pH of 2 or less for maximum oil removal. The water discharging from this process must be further treated for pH before it can be discharged to the sewer. In some instances, this water may be pH adjusted up to 10 for solids removal and then back to a near neutral pH prior to discharge. The advantage of this process is that the oil is removed in a liquid state allowing it to be further recovered for re-use. In both the DAF and Electroflocculation processes, the oil is removed as part of the solids sludge which requires more expensive landfill disposal. The disadvantage of this process is that VOC's and suspended solids must be treated separately.

Oil skimming

Skimmers are often used in conjunction with very large equalization tanks or even ponds where sufficient retention time enables the oil to float to the top. Skimmers move around the surface of the tank or pond removing the top oil/water layer for further concentration, separation and recovery. In some installations, mechanical action or fluid dynamics (gravity flow or recycle pump velocity) may be used to help move the oil towards a stationary skimmer.

The water in this system is pH controlled, and coagulants may also be added to assist solids in settling to the bottom of the tank or pond. The solids can then be removed and dewatered in a conventional filter press or rotary vacuum filter.

Microfiltration (see figure 5) utilizes a special polyester filter to remove suspended solids, precipitated heavy metals, oil and grease without polymers, or other flocculating agents. Microfiltration differs from ultrafiltration or reverse osmosis in both pore size and operating pressure. Microfiltration will filter particles as small as .1 microns, at operating pressures of only 10 psi. Reverse osmosis (the other extreme) filters particles as small as .0001 microns at operating pressures up to 1000 psi.

The process again involves screening followed by an equalization tank. A clay-like additive may be added to adsorb oil and grease. The water is then pumped into the filter banks. The treated water can be reused or discharged to the sewer. The concentrate is returned to the equalization tank for refiltering. The feed tank is discharged as needed to a filter press tank and then to a filter press to produce a dry sludge.

pH control of the water feeding the filters is important to prevent damage to the filter media. The discharge to the sewer is also normally monitored for pH level.

Microfiltration

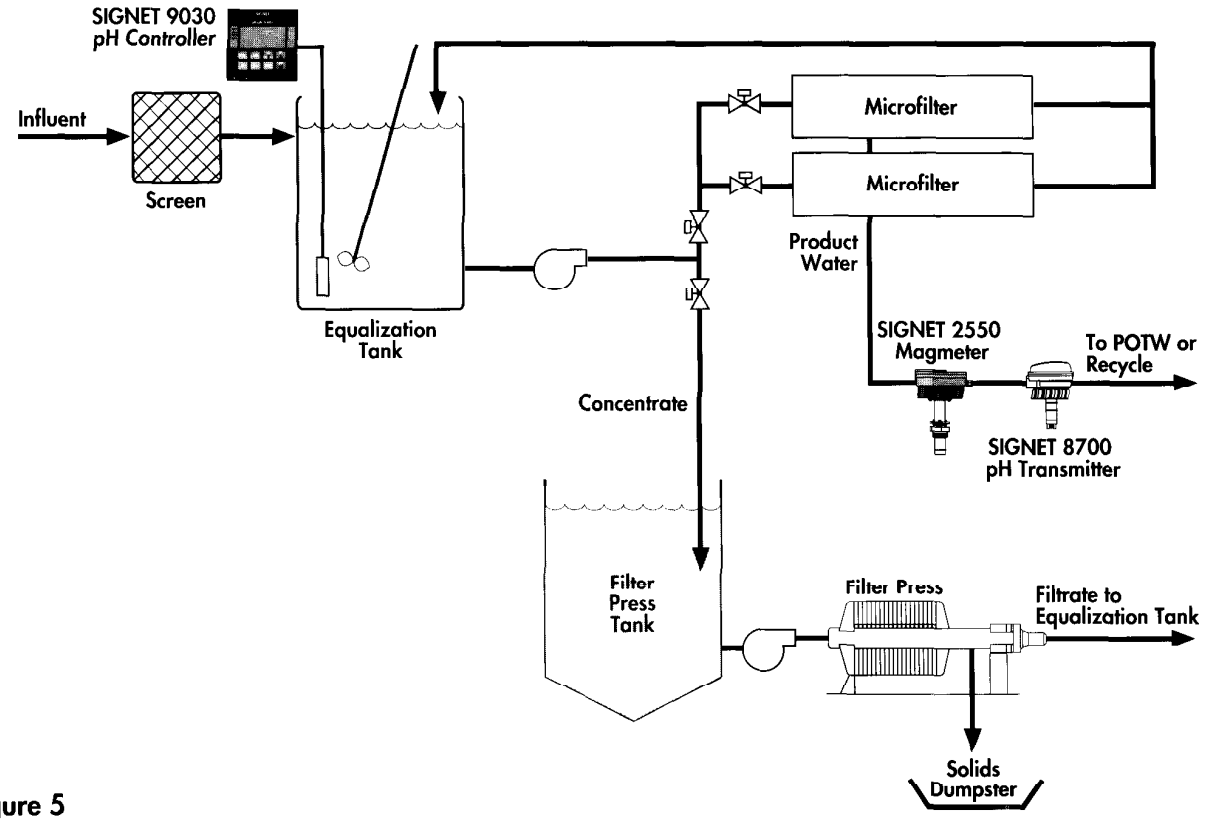


Figure 5

VOC Stripping

If the laundry being processed contains large concentrations of solvents or VOC's (Volatile Organic Compounds), it will be necessary to pretreat these prior to laundering. The VOC's must be "stripped" to enable recovery of the solvents. This is especially comon when processing shop towels as opposed to uniforms or linens. Data showing the average concentration of VOC's and other pollutants for shop towels versus uniforms is shown in the table below. These very high concentrations must be stripped from the towels to remove the solvents before the towels are laundered. The recovered solvent must be handled differently than the solid waste recovered in the oil and solids separation processes. VOC's are considered a hazardous waste which is normally incinerated at a licensed hazardous waste facility.

Raw wastewater pollutant loading comparison between laundering shop towels and uniforms.

Data are based on pounds of pollutant loading per 1,000 lb. of shop towels vs. 1,000 lb. of uniforms and measured in pounds of pollutant per 1,000 lb. of soil[1].

Pollutant	Shop towels	Uniforms
Total VOC	1.49	0.014
Total semi-VOC	1.11	0.032
Total priority pollutants	0.718	0.154
Total common metals[2]	16.6	3.55
Total other metals[3]	0.420	0.115
BOD	46.3	8.29
COD	188	47.3
TSS	78.6	9.14
Oil and grease	113	3.58
Flow (gal./lb.)	2.1	1.7

Source: EPA "Preliminary Data Summary for Industrial Laundries," September 1989.
[1] These estimates based on average concentration and production during two-day sampling episode and long-term average flow rates.
[2] Total common metals = Ca, Fe, Mg, Na
[3] Total other metals= Al, Ba, B, Co, Mn, Mb, Sn, Ti, V, Y

Linen Supply

Suspended Solids Removal

The laundries that deal with Linens only, often do not need to focus on oil and grease removal. These plants instead focus merely on removal of suspended solids (dirt) in the waste water which can be removed in more traditional solids settling processes. These processes enable removal of colloids, primary heavy metals pollutants and small amounts of oil.

The traditional process (see figure 6) for solids removal is a three step process which involves addition of a lime slurry to adjust the solution to a pH of 10, followed by addition of a polymer to assist in the agglomeration of any colloidal or suspended materials. Finally the solution flows into a solids separator, most commonly an inclined plate clarifier. Clean water flows freely from the top of the clarifier to the discharge sewer, while the sludge at the bottom is removed and concentrated. The sludge will then be pressed and dried in either a standard filter press or a rotary drum vacuum filter, with the final dried sludge removed to a landfill

Suspended Solids Removal

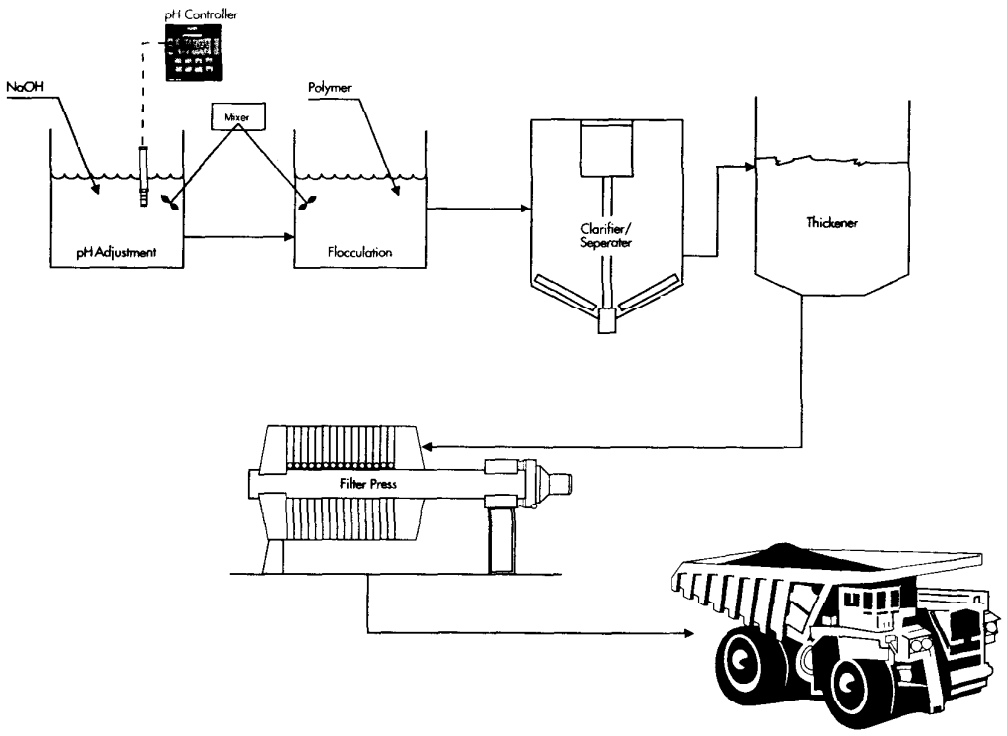


Figure 6

System Design for Industrial Laundry

Most systems will be engineered to achieve a reduction in a defined level of contaminants. The preferred process depends on the individual waste stream and whether it consists solely of oils and greases, whether heavy metals must be removed, whether VOC's are present and must be stripped, the concentration of the pollutants, and the total flow rate of the system. Although many installations are OEM based, it is not uncommon to find a customer adding a single additional treatment step, or to upgrade a single process step within their process. As discharge permits become more strict, laundries are adding additional equipment to enable them to more easily meet their discharge limits and their customers demands.

pH Control

Regardless of the technology selected for treatment of the laundry's waste, pH control is proven to be an important factor for optimum control of each process. The SIGNET 9030 pH Controller and 2712 flat surface submersible pH sensor are an ideal system for these applications. The flat surface electrode is not susceptible to lint fibers becoming trapped around the glass bulb and shields, and also resists coating from any oil and grease that is present. When cleaning is needed, the flat design enables efficient cleaning of both the measuring flat glass surface and the reference junction.

The 9030 Controller offers a variety of customer selected outputs for control of pumps, valves or alarms, plus analog outputs for recording or valve positioning. Plug-in cards for these outputs enable each system to be tailored to each customer's specific needs, and simplifies set-up by only requesting set points for those outputs installed. Simple front panel access enables the customer to expand the outputs at a later date if desired by simply plugging in an additional output card. There is no need to return the unit to the factory.

Final Effluent Monitoring

Monitoring of the final effluent flow rate is also very important to these companies. Reducing their total water consumption can mean significant savings to their total operating cost. In addition, new equipment purchased is based on the flow rate of water requiring treatment. The flow rate must be accurately established in order to achieve desired reduction of contaminants in the waste treatment process equipment. The SIGNET 2550 Magmeter has proven to be an excellent choice for monitoring these flows.

Final effluent will also likely be monitored for pH. Allowable discharge pH depends on the local santitation district (POTW). The type of treatment selected for the plant will affect the pH of the discharge water which may or may not require further adjustment before discharge. If the water in the waste treatment process at any time exceeds the discharge limit window, the pH of the final effluent should be monitored and recorded. If concentrated acids or bases are used for pH adjustment at any time in the waste treatment process, it is also recommended that the final effluent be monitored for pH to detect the possibility of leaks within the plant. The SIGNET 8700 pH transmitter provides a simple installation and a fully isolated two-wire signal transmission to a recorder, PLC or computer. If alarm indication is desired, a SIGNET 9030 Controller with relays and current output cards may be preferred.

2712 Submersible Flat Surface pH Electrode

Institutional Laundry

Institutional Laundries can be found wherever a large volume of uniforms or linens are used. They are "in-house" laundries that handle the needs of their own employees or customers. Many of these will in fact have no monitoring or control on their process or their waste discharge, but wherever large volumes of water is being used, it is common to find flow monitoring. Hospitals, large resorts or amusement parks, prisons, Military Bases and even large manufacturing plants may have laundry facilities that incur significant expense for water useage that will justify water monitoring practices.

One specific segment of this industry is the medical industry. In addition to cleaning of the uniforms and linens, this segment is characterized by the need for disinfection. This is most commonly done using very high temperatures during the cleaning process that is successful in killing any bacteria or virus that may be present. In many cases, this hot water is recirculated to extract the heat prior to discharge into the sewer. Flow rates and temperatures are generally monitored in this heat exchange process to optimize the heat extraction.

Final effluent flow may also be monitored as the water consumption in a large institution can be a significant operating expense for the facility. Tracking these flow rates can help to keep them and the associated cost in control.

Diaper Services

For a weekly service fee, today's diaper services will provide the customer with a weekly supply of diapers, pick up the previous week's dirty diapers, launder, disinfect and return for reuse.

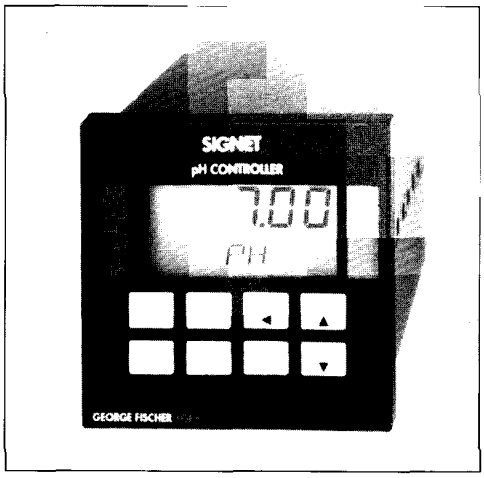
Laundering of the diapers is similar to conventional laundry with the addition of a pretreatment to remove solids and a post treatment to disinfect and chemically treat the cotton if desired. Waste treatment may include pH adjustment depending on the allowable pH that can be discharged.

One successful SIGNET installation in a diaper laundry uses carbon dioxide to decrease the pH from 10.3 to 8.5 pH before discharge into the city sewer. Carbon dioxide when added to water forms carbonic acid which lowers the pH. Carbon dioxide is the preferred reagent in this installation because it does not require any special permitting for storage or handling. Safety considerations when using carbon dioxide are also less than when operators are dealing with strong acid reagents.

The waste treatment found in these plants is generally minimal as the waste is sewerable. However, a heavy sewer use charge is imposed on these plants based on the amount of water discharged. Effluent flow monitoring is therefore very important to these plants. SIGNET has proven success with the 2550 Magmeter for monitoring the waste flow

Acid Washing

Acid washing of blue jeans has become a very standard process for millions of blue jeans produced every year. The manufactured blue jeans are processed through a large machine similar to a washing machine that contacts the jeans with a mild acid solution at high temperatures (160 to 180F) to provide pleasing color variations. Most acid washing machines can process batches of 500 pairs of jeans at one time.



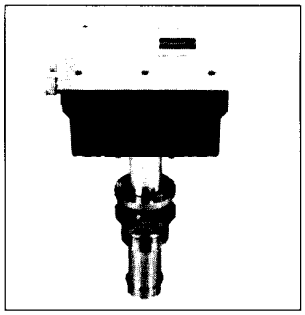
The SIGNET 9030 pH Controller can be configured for a variety of standard inputs and outputs.

The pH of the acid washing solution is normally monitored in a recirculation loop outside of the actual washing machine. This prevents damage to the electrode from the agitation of the materials in the machine. A low alarm relay is used to add additional acid if the pH drops below the set point.

It is recommended that a strainer be used prior to the pH electrode to collect fibers and lint. The flat surface pH electrode is a good choice to prevent fibers from catching on the electrode The strainer and pH electrode will require routine cleaning and the pH system should be calibrated on a regular basis. The SIGNET 9030 pH Controller is the ideal choice for these applications, offering the end user selectable pH resolution of .1 or .01 pH, and optional output control and recording options including on/off relays, proportional pulse to metering pumps, and analog proportional to a control valve, recorder or computer.

Any facility performing acid washing of blue jeans will also require pH neutralization in their waste treatment.

Effluent Flow Monitoring



The SIGNET 2550 Insertion Magmeter installs in less than one man-hour in pipe sizes from 2" - 12" diameter.

Water is very important to the laundry industry. It represents one of their largest expenses, second only to electricity. Most plants are now monitoring both their total incoming water and their total effluent discharged. This enables them to immediately identify a water usage prob lem. Finding ways to reduce their water consumption enables them to expand their operation (add additional washing machines, etc.) without re-permitting the facility with the sanitation district, and without the additional capital expense of expanding their waste treatment system capacity.

Water reuse is one common method of reducing total water usage. Final rinse waters may be treated separately including deionization to allow reuse, or may be used untreated as a prewash to enable more efficient use of the total water consumed in the plant.

Waste discharge permits limit the amount of gallons to be discharged, the average daily maximum level of pollutants (oils and heavy metals) in ppm (mg/l) that can be discharged, and the *total* amount of the pollutant that can be discharged in pounds per day. This means that although the waste treatment process may be in control for ppm of the pollutant in the effluent, if the flow volume increases significantly from their permitted daily volume, the plant may still be out of compliance for total pollutants discharged.

Finally, documentation of the waste flow can also help to determine when a process change may have occurred that is generating additional waste. For example, a stuck water solenoid on a machine can result in tens of thousands of additional gallons of water being used. Data from a waste stream flow totalization system can help to identify when such problems occur.

The SIGNET 2550 Magmeter provides an ideal measurement technology for the effluent waste stream. Proper removal of any oil in the system is of course a requirement for both the laundries discharge permit and for proper operation of the magmeter. In addition, the neutralized solution is generally high in conductivity, and there is no rotor to be interfered with if fibers are inadvertently discharged. A low spot in the piping system can insure a full pipe at all times. A flow rate and totalizing system can provide valuable data for the waste treatment system Engineer.

The SIGNET 2550 Magmeter has no moving parts and does not obstruct the flow in the pipe. System accuracy is ± 2% of reading. The 2550 features state of the art microprocessor technology with enhanced signal conditioning, improved signal-to-noise ratios and greater output signal flexibility. Software advances allow for menu-driven operation and process diagnostics. The SIGNET 2550 has proven success in laundry effluent lines in both industrial laundry and diaper service industries. When compared to full line magmeters, it is the clear choice when total costs including purchase price, cost of installation and maintenance costs are compared.

Water Minimization

The Laundry Industry uses very large volumes of water in its cleaning machines. Getting the maximum use out of the water by recycling and reusing the water can mean tremendous savings to the customer. Installation of systems to enable reuse of the water will generally pay for themselves in a very short period of time.

One simple method of water reuse is to simply use water from a final rinse cycle as the water for the initial wash cycle. Or, in larger plants, water from "clean" garment machines such as those used for towels or bedding can be reused in the "dirty" machines used for garments with heavy oil and grease such as shop towels, mechanics uniforms, etc. In these cases, little or no treatment may be required of the water. As a precaution however, screens or filters may be installed.

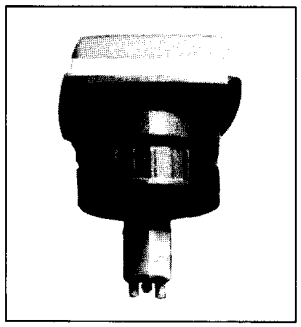
In plants with little oil or grease, clean wastewater may be recycled back to the plant for further treatment to enable reuse in virtually any wash or rinse cycle. This treatment may include microfiltration, or deionization to insure adequate water quality prior to use.

Wherever water is recycled, it is common to find monitors including flow, pH and conductivity on the lines to insure that the process is operating properly, and that the water is of the quality required for good cleaning and rinsing. Flow rate helps to determine that the recycle system is working properly without plugging in the strainers or filters. Flow totalization helps to determine the amount of water being saved through recycling, and insures that systems in the recycle loop are sized correctly and maintained properly. Maintenance of the system may in fact be called for by an alarm indication after one million gallons, or other appropriate volume of water has been treated or filtered.

pH monitoring on the recycle water helps to insure that the water stays within a safe usable pH range for efficient cleaning and does not cause damage to sensitive fabrics. Conductivity monitoring insures that salts in the water remain at a concentration low enough to insure good rinsing. Traditional waste treatment neutralization produces salts in the water. These can be removed using deionization, but the customer must carefully evaluate the cost of "new" water versus the cost of deionization. It may be best to simply use the water unless it exceeds a high conductivity alarm limit, at which time it is discharged to the sewer.

SIGNET can provide all of the sensors and controllers for monitoring these recycled water systems. The flow sensor must be selected carefully based on the characteristics of the water in the pipe. Fibers must be removed prior to flow sensing if a paddlewheel type sensor is being used. There must be no oil or grease present for monitoring with the 2550 Magmeter, and oil can also cause interference with both pH sensors and conductivity sensors. In general, oily water is not reused for either washing or rinsing garments, but this source of the water should be inspected.

SIGNET offers the customer the advantage of one-stop shopping for all of their water and waste monitoring and controlling needs, with a competitive price, and system availibilty that is unsurpassed in the industry.



The SIGNET 8700 pH/ORP Compak Transmitter features a complete sensor/electronic package, providing a two-wire process ready isolated 4 to 20 mA output.