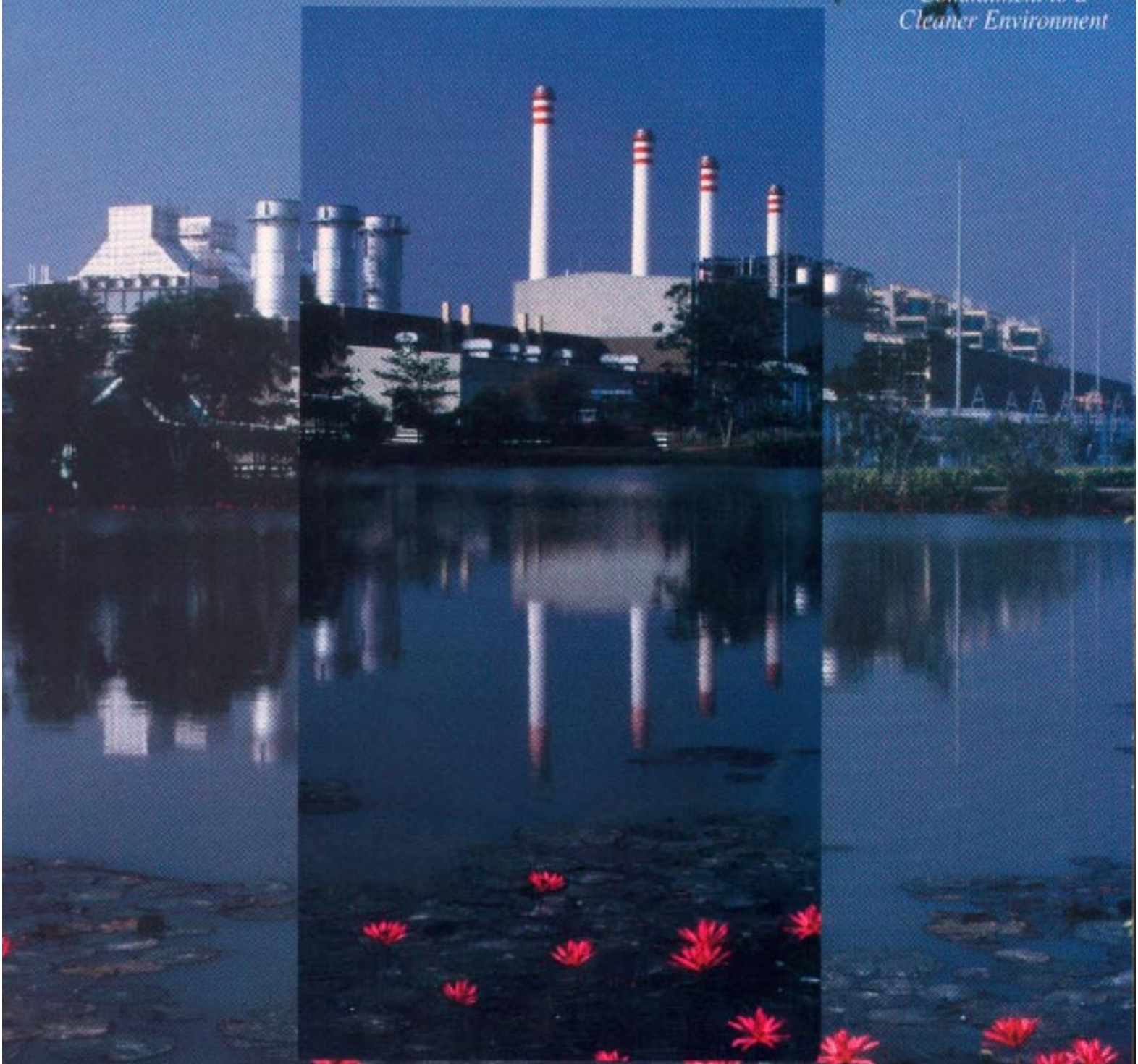
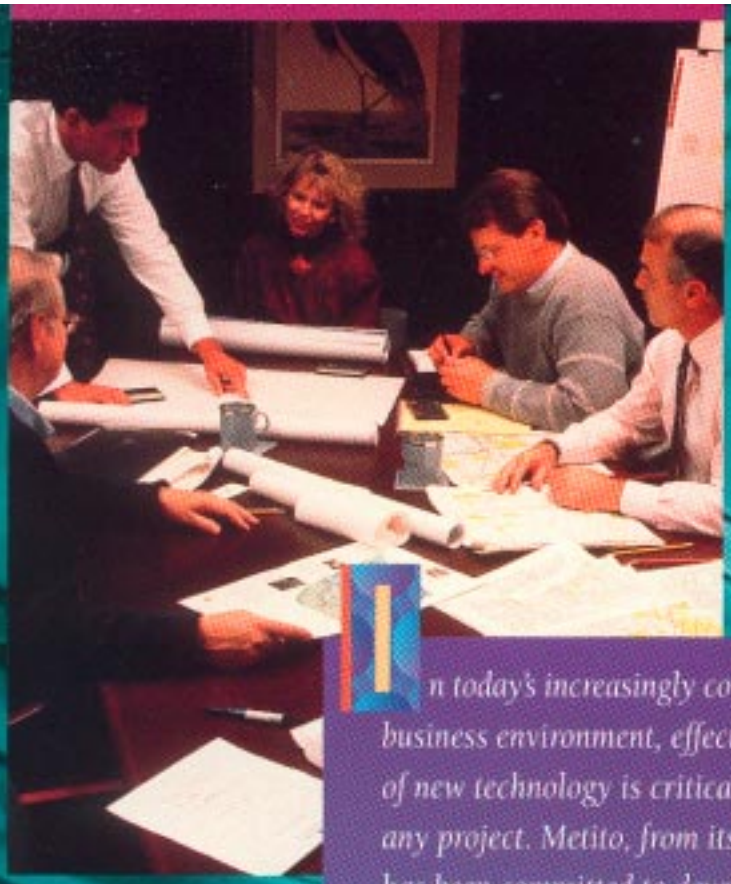
METITO

Commitment to a Cleaner Environment



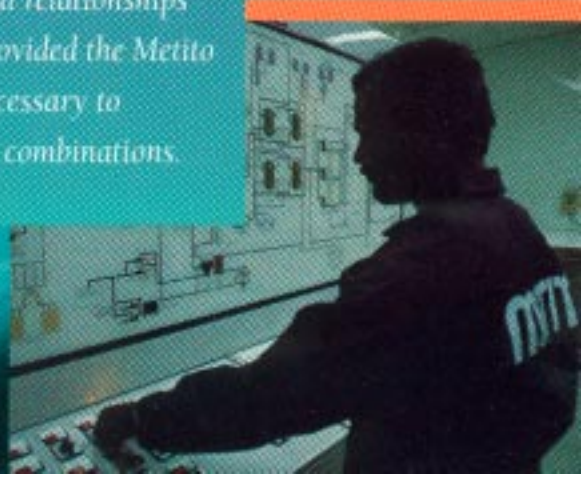
Industrial Ion Exchange Demineralization

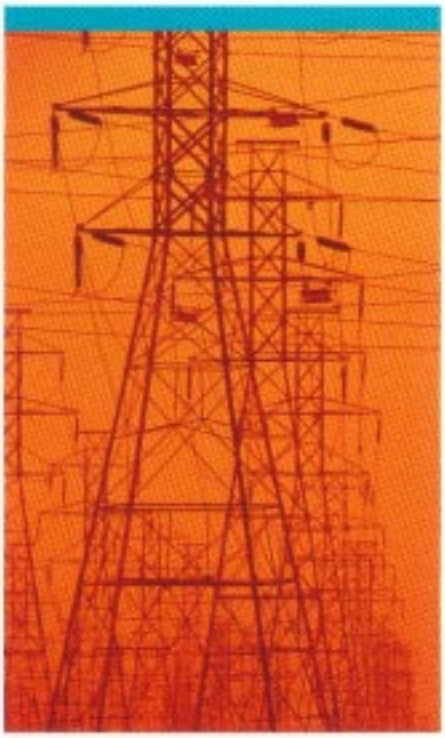


In today's increasingly competitive and complex business environment, effective implementation of new technology is critical to the success of any project. Metito, from its beginning in 1958, has been committed to developing and maintaining the special expertise necessary to evaluate, select and implement state-of-the-art water treatment and ION EXCHANGE technologies. Metito's approach combines theoretical expertise with the practical experience of an engineering and contracting company.

Metito offers engineering, code-vessel fabrication, assembly, control and instrumentation and final testing all within its in-house facilities. This total capability assures the client performance reliability, schedule adherence, and utmost savings.

The Metito staff is composed of over 600 highly motivated managers, engineers, and skilled technicians whose industry experience runs collectively in the hundreds of years. The extensive in-the-field experience, plus ongoing technical relationships with resin manufacturers have provided the Metito engineers with the knowledge necessary to recommend optimal resin/system combinations.





Metito manufactures a complete line of ion exchange and pretreatment systems. Equipment includes sediment filters, activated carbon filters, reverse osmosis, water softeners, weak-acid and strong-acid cation exchangers, weak-base and strong-base anion exchangers, and mixed bed demineralizers. These units are complemented by auxiliary equipment, such as forced draft decarbonators, regenerant chemical metering pumps with dilution controls; booster pump and recirculation pump assemblies and complete instrumentation. PLC logic controls these integrated systems. Operating modes may be fully automatic, semi-automatic or manual.

Metito demineralization systems utilize the wide selection of modern ion exchange resins that are available; i.e., standard gel resins, macroporous resins and acrylic resins. Each application is carefully evaluated by our staff of experts to ensure that the selected resins will provide optimum performance.

Typical applications where Metito systems may be found are:

Low Pressure Boiler Feedwater

Ion exchange is used to reduce total solids, hardness, alkalinity, and silica levels to satisfy boiler water limits, based on the Boiler Manufacturers Association quality requirements. This covers boiler pressures ranging from under 21 kg/cm^2 (300 psi) to 140 kg/cm^2 (2000 psi). A variety of treatments are available depending on the mineral content of the inlet water and boiler operating pressure. These options include water softening, chloride cycle dealkalization, split stream dealkalization, weak acid cation exchange and two bed demineralization. Your Metito technical representative will assist you in evaluating the best treatment method.

Once through and Supercritical Boiler Feedwater

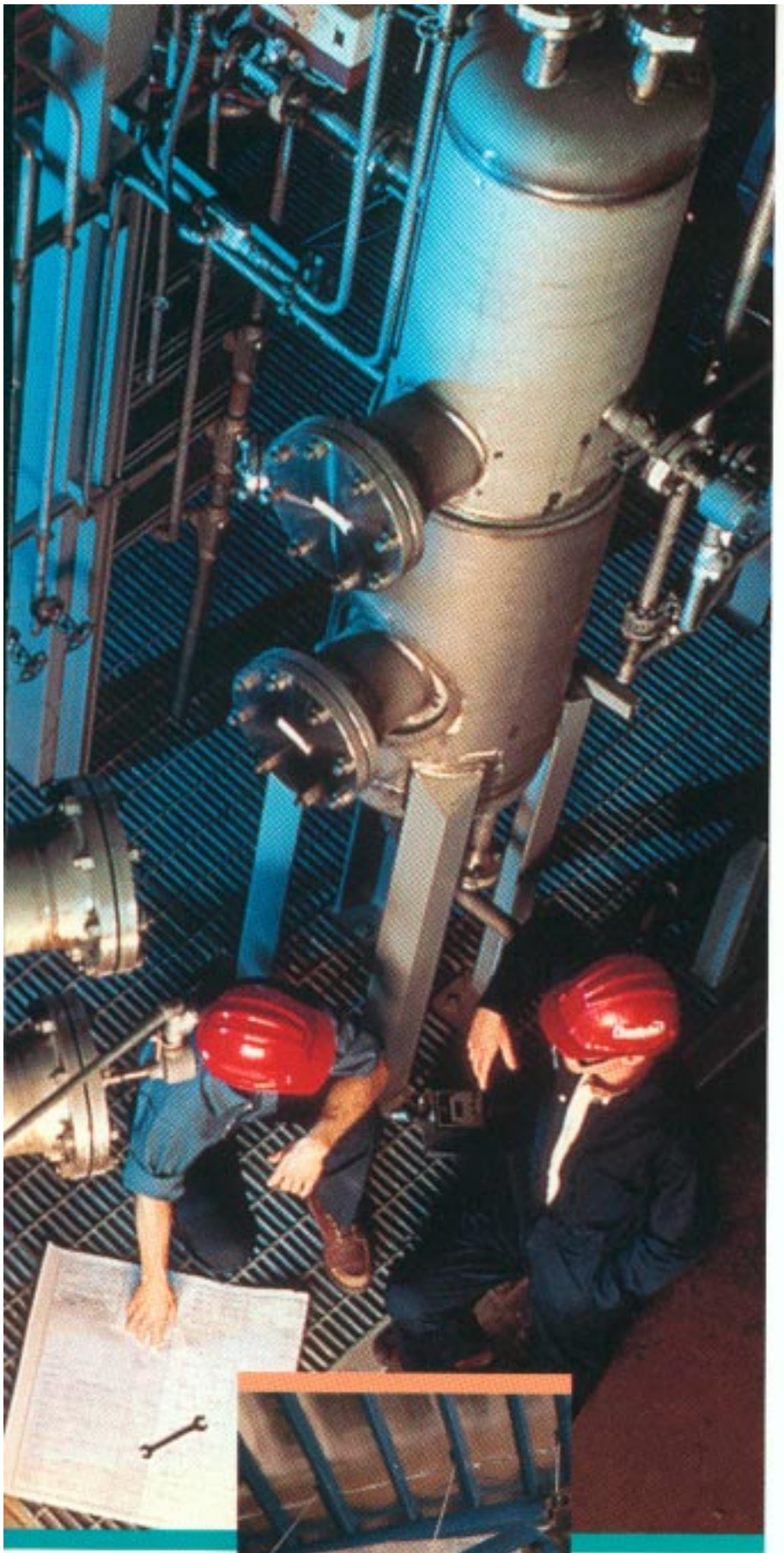
Water quality requirements are very stringent, measuring in a ppb (parts per billion) range, thus necessitating complete deionization. These systems utilize Two Bed demineralizers, followed by a Mixed Bed polisher. In all cases, pretreatment by sediment filters and activated carbon filters is necessary to protect the ion exchange resins from fouling and degradation. Depending upon the original water source, chemical pretreatment ahead of the filters may also be necessary to remove suspended solids and organic matter.

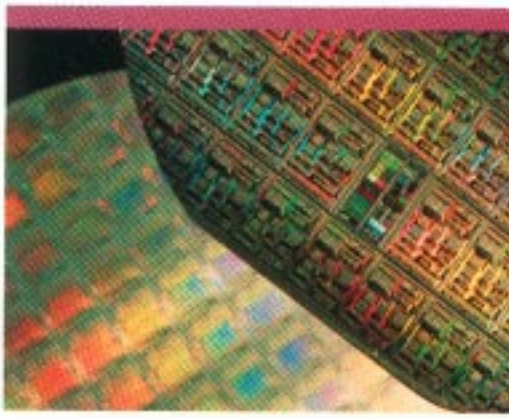
Condensate Polishing

Recovery of condensate for re-use in boilers both conserves expensive heat energy values and reduces makeup feedwater volumes. This recovered water however, must meet or exceed purity requirements for makeup water. For this reason, ion exchange plays an important role in purifying condensate. This pertains to both medium pressure and high pressure boilers.

A special water softener (cation exchanger operated in the sodium form) is usually adequate for low and medium pressure boilers. These resin beds filter suspended products of corrosion and remove dissolved iron, copper, and hardness.

High pressure and supercritical systems require more extensive treatment. Large vessels, containing mixed beds of H-form cation resin and OH-form anion resin, are used to process condensate at very high flow rates. The resin bed filters out any suspended particles that result from corrosion within the piping network. They also remove dissolved minerals; e.g., soluble corrosion products or salts that may leak from the condenser cooling water into the recirculating system. Service runs are terminated either by high pressure loss across the bed or by ion breakthrough. When an exhaustion end point is reached, spent resins are sluiced to a remote regeneration station where they are processed. When this resin transfer is complete, a fresh charge of resin is sluiced into the polisher so it can be returned to service.





Electronics Industry

Ultra high purity water (18.0 megohm) is required in the production of silicon wafer, semi-conductor computer chips and printed circuit boards. Production and maintenance of these high purity waters involves not only extensive treatment of incoming water, but also recirculation and additional polishing of the processed water. Typical make-up water treatment consists of chlorination, deep bed filtration, two bed demineralization (or reverse osmosis, depending on the situation), mixed bed demineralization, 1.0 micron filtration, submicron filtration, and finally storage. Water in the storage tank recirculates continuously, subjected to UV sterilization, non-regenerable mixed bed polishers and submicron filtration.

Process Chemical Applications

Ion exchange technology plays an important role in many pharmaceutical and food processes. These applications rely on the ability of resins to decolorize and de-ash a wide range of solutions and process chemicals. In addition, special grades of resins find uses in the chromatographic separation of different molecular species. The largest application of this type is in the processing of sugar solutions.

To meet the requirements of a client in the most cost effective manner, Metito offers the choice of CUSTOM ENGINEERED or PRE-ENGINEERED (Standard Package) TWO BED and MIXED BED DEMINERALIZERS. However, where possible, pre-engineered models represent good value for money incorporating the highest quality materials, as well as many standard features that are normally offered by others as optional extras.

TWO BED DEMINERALIZERS

Metito "Package" two bed demineralizers are pre-engineered, automatic deionizers of proven design and performance. These units satisfy the most demanding requirements of applications ranging from production of ultra high purity water, to purification and decolorization of process chemicals, to treatment of heavy metals and toxic wastes. System reliability, ease of operation, and ease of maintenance are assured because "attention to detail" is stressed at all times.

A Metito two bed deionizer consists of two resin tanks which operate in series complete with integral tank piping, control valves, regeneration facilities, instrumentation, and electrical controls. One tank contains cation resin; the other, anion resin.

Water flows through the cation resin first, then through the anion. This reduces the mineral content of water or chemical process streams to very low levels. Only trace ionizable solids remain. The final level depends on inlet mineral composition, type of anion resin, and amount of regenerating chemicals.

There are two types of anion resins with very different characteristics. These are termed "weak-base" and "strong-base", depending on its chemical strength. Strong-base resin will react with all minerals, removing even weak acids, such as silica and CO_2. Caustic soda is used to regenerate, often at elevated temperature when low silica leakages are required.

Weak-base resins have higher operating capacity than strong-base resin, but function only at low pH. They lack "salt splitting" strength and cannot remove silica and CO_2. These resins are regenerated with caustic soda, soda ash, or ammonia.

The choice between the two depends upon the purity requirements of the application. Weak-base two bed units ordinarily produce water with 3-5 ppm residual minerals, excluding silica and carbon dioxide. In contrast, strong-base two bed units reduce ionized solids to below 3 ppm, including silica and CO_2.

Metito two bed demineralizers are designed for service flowrates from 6 m^3/h (25 gpm) to 60 m^3/h (250 gpm). Operating capacities can be tailored for any given water supply and for any intended application by pairing a standard cation exchanger with any of several standard anion exchangers.

Typical Two Bed Applications

- Boiler make-up water treatment
- Ultra high purity water production
- Process chemical decolorization and purification
- Industrial wastewater treatment and reclamation

Metito "Package" Two Bed Demineralizers

	Model Number	Capacity Rating (Kgr)	Peak Flow (m^3/h)	Peak Flow (gpm)	Tank Dia (mm)	Tank Dia (in)	Tank Shell (mm)	Tank Shell (in)	Pipe Size PVC DIN	Pipe Size PPL* DIN	Liters/Regen H_2SO_4 93%	Liters/Regen HCl 32%	NAOH/ Regen (Kg)	Cation Vol (liter)	Anion Vol (liter)
**	MSB-600	135	6.3	28	600	24	1800	72	40	40	17	78	26	300	275
	MSB-800	245	12.0	53	800	30	1800	72	40	50	30	136	48	525	500
	MSB-1000	395	18.0	79	1000	42	1800	72	50	65	48	220	77	850	800
	MSB-1200	570	26.0	114	1200	48	1800	72	65	80	69	317	110	1225	1150
	MSB-1400	780	36.0	158	1400	54	1800	72	80	80	95	433	151	1675	1575
	MSB-1600	1010	47.0	207	1600	60	1800	72	80	100	124	569	197	2200	2050
	MSB-1800	1300	60.0	264	1800	72	1800	72	100	100	158	725	252	2800	2625
***	MWB-600	175	5.5	24	600	24	1800	72	40	40	17	78	15	300	275
	MWB-800	315	10.0	44	800	30	1800	72	40	50	30	136	28	525	500
	MWB-1000	510	16.0	70	1000	42	1800	72	50	65	48	220	45	850	800
	MWB-1200	730	23.0	101	1200	48	1800	72	65	80	69	317	64	1225	1150
	MWB-1400	1000	32.0	141	1400	54	1800	72	80	80	95	433	88	1675	1575
	MWB-1600	1300	41.0	180	1600	60	1800	72	80	100	124	569	115	2200	2050
	MWB-1800	1670	52.0	229	1800	72	1800	72	100	100	158	725	147	2800	2625

* PPL = POLYPROPYLENE LINED STEEL
** MSB = STRONG-BASE
*** MWB = WEAK-BASE

MIXED BED DEMINERALIZERS

Metito "Package" mixed bed demineralizers exceed water treatment industry standards when high purity water is demanded. These exchangers reduce mineral content to less than 1.0 ppm when used alone, provided that the water is pretreated by filtration to remove sediment and/or organic matter. More frequently, mixed beds serve as "polishers" in large systems employing two bed demineralizers or reverse osmosis membranes, which remove the bulk of the dissolved minerals. In these instances, total ionizable solids are reduced to the ppb (part per billion) range.

A Metito automatic mixed bed consists of a single exchanger tank, complete with cation and anion resins, tank piping, control valves, instrumentation, regeneration facilities and solid state electrical controls. Each unit is factory assembled and skid mounted.

These "Package" mixed beds are designed for service flowrates ranging from 6 m^3/h (25 gpm) to 60 m^3/h (250 gpm). Operating exchange capacity depends upon how a unit is used; i.e., "working mixed bed" or "polisher". Ion removal capacity of working mixed beds can be tailored for a given application by adjusting regenerating chemical volumes. Frequently, chemical dosages may be selected so that wastewaters will be at nearly neutral pH.

Metito "Package" Mixed Bed

Model Number	Capacity Rating (Kgr)	Peak Flow (m^3/h)	Peak Flow (gpm)	Tank Dia (mm)	Tank Dia (in)	Tank Shell (mm)	Tank Shell (in)	Pipe Size PVC DIN	Pipe Size PPL* DIN	Liters/Regen H_2SO_4 93%	Liters/Regen HCl 32%	NAOH Regen (Kg)	Cation Vol (liter)	Anion Vol (liter)
MMB-600	160	6.3	28	600	24	2400	96	40	40	10	32	18	125	190
MMB-800	290	12.0	53	800	30	2400	96	40	50	18	58	34	225	350
MMB-1000	465	18.0	79	1000	42	2400	96	50	65	30	97	53	375	550
MMB-1200	670	26.0	114	1200	48	2400	96	65	80	42	136	77	525	800
MMB-1400	915	36.0	158	1400	54	2400	96	80	80	58	188	103	725	1075
MMB-1600	1200	47.0	207	1600	60	2400	96	80	100	76	246	134	950	1400
MMB-1800	1530	60.0	264	1800	72	2400	96	100	100	96	311	173	1200	1800

METITO DUAL MIXED BED DEMINERALIZER

Standard Features

Engineering standardization enables Metito two beds and mixed beds to include, as standard, many outstanding features that are usually offered by other manufacturers only in "custom" systems. All units are ruggedly constructed and designed to provide easy installation, long term reliability, ease of operation and ease of maintenance. Design features which directly benefit the purchaser include:

Factory Pre Assembled and Skid Mounted - Quality workmanship by specialists in demineralizer fabrication insures maximum reliability. Prefabrication greatly reduces installation start-up time and costs. Installers need only anchor skids, reassemble match marked piping assemblies, load resins and connect the system to plant utilities and services.

Exchanger Tank Construction - Tanks are fabricated of carbon steel, designed and constructed to BS 5500 and ASME section VIII specifications. Design working pressure is 7 kg/cm^2 (100 psi). Interiors are lined with 5 mm rubber and exteriors are sandblasted and protected by a paint primer. Non-code tanks or special finish paint coatings are available, if desired.

Rugged Internal Flow Distributors - Internal piping systems are computer-designed for both co-current and counter-current operation. This application of hydrodynamic technology ensures uniform flow distribution through the resin beds.

Resin Removal Nozzles - Usually offered by most manufacturers only as a "custom" feature, these nozzles simplify resin sampling and removal.

Automatic Rinse Features - Rinse operations at the end of a service run, after stand-by and during regeneration, are controlled by conductivity. This conserves water and insures that maximum water quality is maintained.

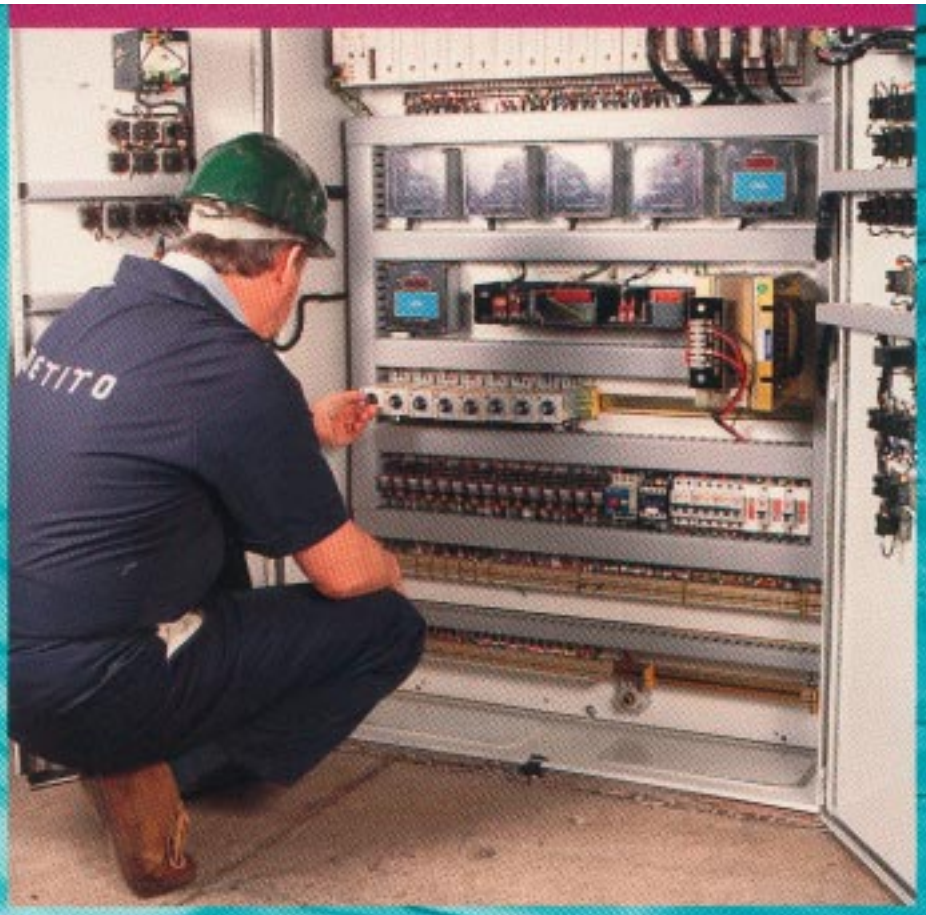
Solid-state Cycle Controls - Programmed logic allows service runs and regeneration cycles to be actuated either automatically or manually by push button. System controls are housed in NEMA enclosures, completely wired, pretubed and tested.

Equipment Options

Choice of Tank Face Piping - Either Sch. 80 PVC or polypropylene lined steel piping are available. PVC piping have cement joint socket fittings and Noryl body valves. Lined steel systems use 150# flanged fittings and diaphragm valves. Both types of valves are pneumatically actuated.

Chemical Dilution Controls - Acid and caustic dilution tanks with capacity for one regeneration are standard for tank diameters up to 1000 mm (42"). Skid mounted chemical metering pumps are standard for 1000 mm (42") or larger tank diameters. Smaller tank diameters use eductors instead for introduction of chemicals to the resin beds. Pump assemblies are available for smaller than 1000 mm (42") tank sizes, but are at an extra cost.

Caustic Dilution Water Heater - Silica leakage levels depend upon the residual silica on the anion resin after regeneration. Since silica removal is an essential role of strong-base anion resin, heated caustic is recommended for these units. Hot caustic helps to dissolve polymeric silica and is suggested if outlet levels of 100 ppb or less are required. Accessory electric heaters (instantaneous and tank type) or steam heat exchangers are available.



Volume Totalizer With Alarm Contact - Service runs can be terminated by water resistivity at a given endpoint, or silica breakthrough, or by metered volume delivery. Metered delivery is preferred in high purity systems because on-stream time is usually long. Maximum water quality is best attained when runs are terminated before an exhaustion endpoint is reached.

Commitment to a
Cleaner
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METITO

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METITO WORLDWIDE LOCATIONS

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