



WATER TREATMENT AT POWER PLANT

# Flue Gas Desulfurization Blow-Down & Ash Pond Treatment Product Recommendations

Wet scrubbers used to remove SO<sub>2</sub> and other pollutants from flue gas are periodically purged to discharge accumulated solids. This Flue Gas Desulfurization (FGD) wastewater stream is high in TDS and hardness, and contains residual quantities of micropollutants (such as boron, nitrates/nitrites, arsenic, mercury and selenium) that, along with associated ash ponds at coal fired power plants, are subject to increasingly stringent regulatory requirements. Treatments for contaminant removal or even zero liquid discharge using evaporative technologies may be required to achieve compliance, but are challenged by both high cost and operational difficulties. Dow offers a comprehensive portfolio of treatment solutions to manage the difficulties of FGD and ash pond wastewaters. Dow's minimal liquid discharge solutions can be integrated into a zero liquid discharge (ZLD) process, trimming the high capital and operational costs required to run thermal evaporation equipment. The high costs of ZLD using thermal evaporation equipment have many customers turning to a minimal liquid discharge (MLD) approach: a core set of proven ultrafiltration, reverse osmosis, nanofiltration and ion exchange based technologies and processes that enable users to maximize recovery at a fraction of ZLD's costs. An MLD approach may be used as a stand-alone solution or as a component of a ZLD process to reduce overall treatment cost. Dow also offers selective media that can preferentially remove individual contaminants such as boron, mercury or other heavy metals in a treat to discharge approach.

TECHNOLOGY	PRODUCT	APPLICATION	FEATURES AND RECOMMENDED USES
<b>ULTRAFILTRATION MODULE AND SKID</b>	DOW IntegraFlux™ SFP-2880XP Module	Suspended Solids Removal	High permeability and high mechanical strength hollow fiber polyvinylidene fluoride (PVDF) membranes. The modules provide excellent performance, industry leading membrane area with low energy and chemical consumption. XP fiber provides up to 35% higher permeability than previous generation modules improving operating efficiencies and productivity.
	DOW™ Ultrafiltration SFP-2880 Module		High mechanical strength hollow fiber PVDF membranes. The modules provide excellent performance with industry-leading membrane area.
	DOW IntegraPac™ IP-77XP Skid		The skids are pre-engineered, standardized and ready to assemble. Comprising of DOW IntegraPac™ modules (standard and XP fiber), auxiliary parts and piping the skids can significantly streamline design, assembly, and installation. Flexible sizing with 6-22 modules per skid.
	DOW IntegraPac™ IP-77 Skid		
<b>ION EXCHANGE RESINS</b>	DOW AMBERLITE™ IRC83 H	Softening	Weak acid cation softening resin for higher TDS waters (>5,000 ppm). Up to 30% more operating capacity than traditional WAC resins. Fewer regeneration cycles reduce waste volume up to 15%. Superior physical stability yields long resin life.
	DOW AMBERLITE™ IRC200 Na		Strong acid cation softening resin for low TDS waters (<5,000 ppm). Macroreticular structure with high degree of crosslinking for resistance to oxidative, thermal, mechanical and osmotic stress.
<b>REVERSE OSMOSIS ELEMENTS</b>	DOW FILMTEC™ FORTILIFE™ CR 100	Demineralization from Challenging Feedwater Source	State-of-the-art solution to tackle tough fouling coupled with excellent salt rejection. The industry's lowest differential pressure 400 ft <sup>2</sup> spiral wound RO module design
	DOW FILMTEC™ FORTILIFE™ XC70	Brine Concentration from Challenging Feedwater Source	Achieves higher concentrate TDS levels >70,000 ppm (as NaCl) when operated within standard RO design limits. Fouling resistant, durable RO element.
	DOW FILMTEC™ FORTILIFE™ XC80		Achieves higher concentrate TDS levels >80,000 ppm (as NaCl) when operated within standard RO design limits. Fouling resistant, durable RO membrane
	DOW™ Specialty Membranes XUS180808 Ultra-High Pressure RO		Operation up to 120 bar (1,740 psi), achieving concentrate TDS levels of 100,000-200,000 ppm. Up to 50% reduction of waste stream / downstream processes; More than 50% energy saving compared to conventional thermal technology.
<b>NANOFILTRATION ELEMENTS</b>	DOW FILMTEC™ FORTILIFE™ XC-N	Salt Separation from Challenging Feedwater Source	Selective, high mono-valent ion passage. High di-valent ion & organic rejection. High permeability to allow high water recovery at low energy.
<b>ION SELECTIVE RESIN</b>	AMBERSEP™ IRA 743	Boric Acid and Borate Removal from FGD Blowdown, Magnesium Brine, Irrigation Water and Wastewater	Highly selective macroporous chelating resin. Effective in a variety of waters.
	AMBERSEP™ GT74 or AMBERSEP™ 43600	Mercury Removal in FGD Blowdown and Ash Ponds	Selective thiol- or thioluronium- functionalized chelating resins with excellent capacity for removal of ionic mercury.

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WARNING: Oxidizing agents such as nitric acid attack organic ion exchange resins under certain conditions. This could lead to anything from slight resin degradation to a violent exothermic reaction (explosion). Before using strong oxidizing agents, consult sources knowledgeable in handling such materials.

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