



ARRO

Advanced Recovery Reverse Osmosis

As a globally-recognized leader in reverse osmosis through trailblazing technologies such as HERO® and LoWatt™, Aquatech continually develops cost-effective approaches to better serve evolving client needs. To further this endeavor, Aquatech has developed Advanced Recovery Reverse Osmosis (ARRO), which achieves 20% greater water recovery than conventional RO processes aided by enhanced process dynamics and PLC integration.

www.aquatech.com



ARRO

Sustainable. Modular. Efficient.

Increasing regulatory requirements and disposal costs around the world are prompting industries to reduce their water footprint, and highlight a growing need for innovation in reverse osmosis technology. Currently, it is **challenging for conventional RO technologies to achieve recovery rates greater than 75%** without significant downtime due to frequent cleaning requirements. This limitation consequently warrants equipment for standby capacity, driving up installation costs. The **Advanced Recovery Reverse Osmosis process (patent-pending) effectively addresses these constraints by achieving recovery rates up to 95%** without needing extended downtime for maintenance.

ARRO uses **modular configuration** and **optimized element configuration** to provide a complete solution for any RO application. This technology is disruptive in applications where an existing RO system needs to be improved, or where a new-build RO system with >90% recovery at **low installation cost and fast return on investment** is desired. Additionally, ARRO uses contemporary automation technology to virtually eliminate operator intervention.

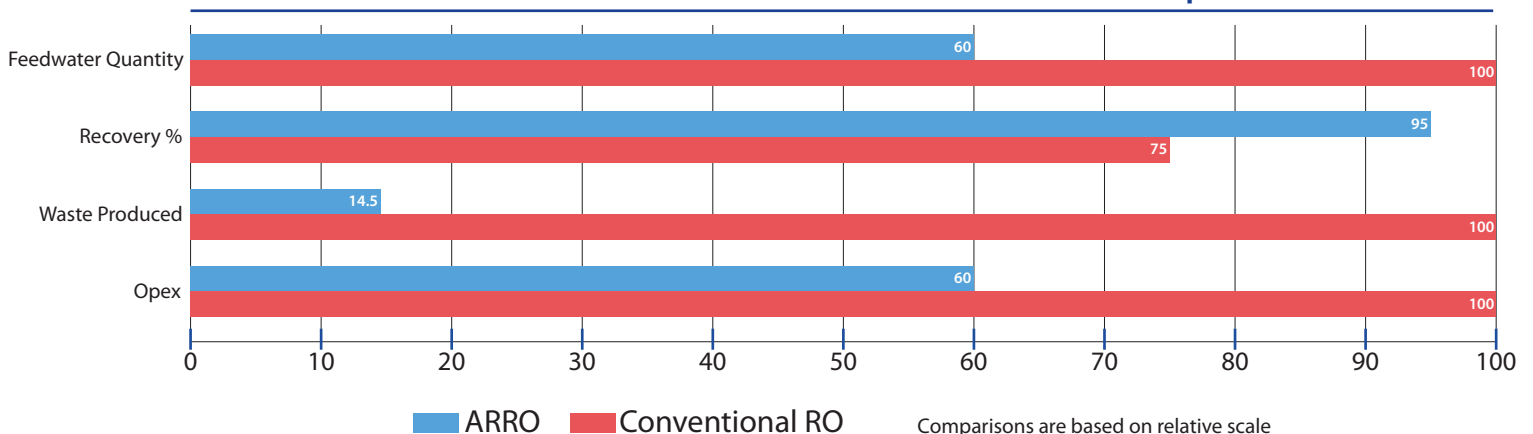
Typical Applications

Food & Beverage
Data Centers
Microelectronics
Petrochemical
Refining
Pulp & Paper
Municipal / Commercial
Mining & Metals
Power

Package Features

- Initial stages are operated at lower concentrations, eliminating the majority of maintenance needs
- Standardized packages (50-250 GPM) meet client needs across various industries and feed water conditions
- Can be easily integrated with existing low-recovery RO system via container, skid mount or trailer mount using ARRO+ configuration (**plug and play**)
- Pay-Per-Gallon and ownership options are both available for ARRO

Value Proposition of ARRO



ARRO

Operational Benefits

- Pre-programmed flush frequencies based on feed water quality. Flushes can be completed with or without chemical dosing
- Reduced maintenance costs and higher uptime due to minimized operating stress on 80% of elements
- Low SDI feed into ARRO guaranteed by pretreatment combining ultrafiltration and media filters when needed
- Flushing done mainly using permeate water, mitigating risk of membrane integrity loss. Water is recycled afterwards, resulting in minimal water loss
- Disposal costs reduced by up to 75%, while energy consumption decreased by 30% compared to conventional RO
- Return on investment for choosing ARRO over conventional RO is <6 months in most applications
- Automatic osmotic cleaning (OsmoCleanse) add-on available for applications with challenging feed waters

ARRO™ Configurations

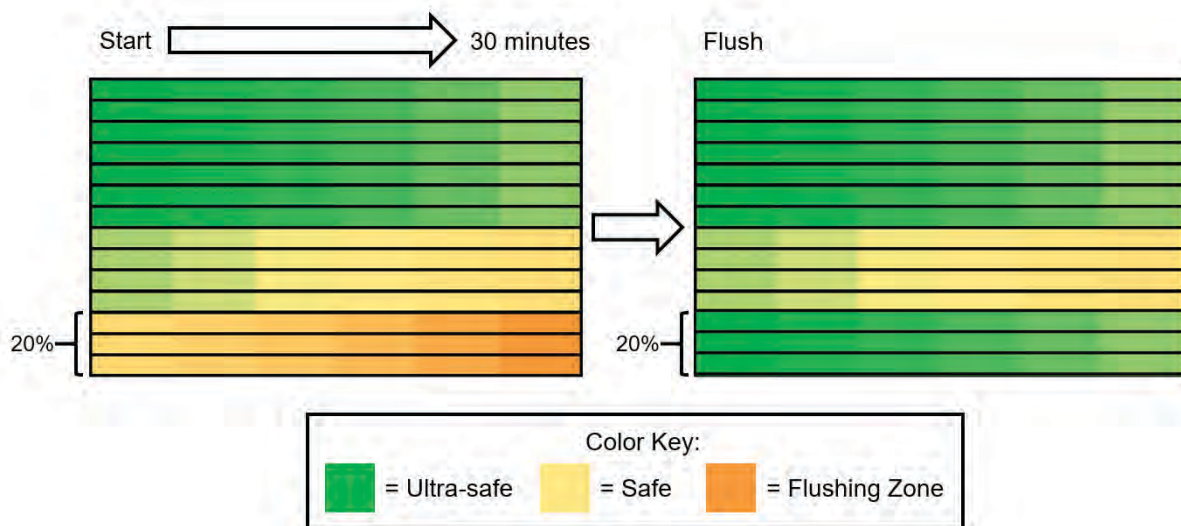
Model Name	Feed Flow Rate (GPM)	Vessel Quantity	No. Elements
ARRO - S - 050	50	4	16
ARRO - S - 100	100	5	25
ARRO - S - 150	150	8	40
ARRO - S - 200	200	9	54
ARRO - S - 250	250	10	70
Custom ARRO	300+ (Contact Aquatech)	n/a	n/a

Suggested Feed Conditions

Parameter	Unit	Value
Recovery	%	Up to 95
Operating Temp	°F	50 - 105
Feed TDS	mg/L	<6000
Feed Silica	mg/L	<50*
Feed Total Hardness	mg/L CaCO ₃	<500*

*Above design conditions can be exceeded with optional preconditioning

ARRO's Breakthrough Membrane Element Configuration



Final stage of ARRO process is only portion that needs to be periodically flushed.

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The Aquatech Advantage

- Upgrade options available, including in-situ OsmoCleanse, pre-filtration, precipitation softening clean-in-place capability and oil-reducing filtration
- Optimized packaged design enables compact footprint and low total installed cost
- Enhanced automation enabling ease of operation and increased efficiency
- Shortened delivery and installation time
- Custom design possible for high capacity needs

ARRO Package Specifications

Model	ARRO-50	ARRO-100	ARRO-150	ARRO-200	ARRO-250
Permeate Flow	50 gpm	100 gpm	150 gpm	200 gpm	250 gpm
Booster Pump Motors					
Booster Pump	10 HP	20 HP	30 HP	40 HP	50 HP
Booster / Flush Pump	3 HP	5 HP	7.5 HP	7.5 HP	10 HP
Cartridge Filter					
Filter Quantity	1	1	1	1	1
Cartridge Quantity	3	6	9	12	15
Installation and Utility Requirements					
Inlet	2.0" flanged	3.0" flanged	4.0" flanged	4.0" flanged	6.0" flanged
Permeate	2.0" flanged	3.0" flanged	4.0" flanged	4.0" flanged	6.0" flanged
Concentrate	1.0" flanged	1.0" flanged	1.5" flanged	1.5" flanged	2.0" flanged
Inlet Water Pressure	15-30 psig	15-30 psig	15-30 psig	15-30 psig	15-30 psig
Air Pressure	80 psig	80 psig	80 psig	80 psig	80 psig
Dimensions and Weights					
Length	203"	243"	243"	283"	323"
Width	64"	76"	80"	80"	80"
Height	76"	82"	82"	84"	84"
Shipping Weight	4,500 lbs	5,500 lbs	7,500 lbs	8,500 lbs	9,500 lbs