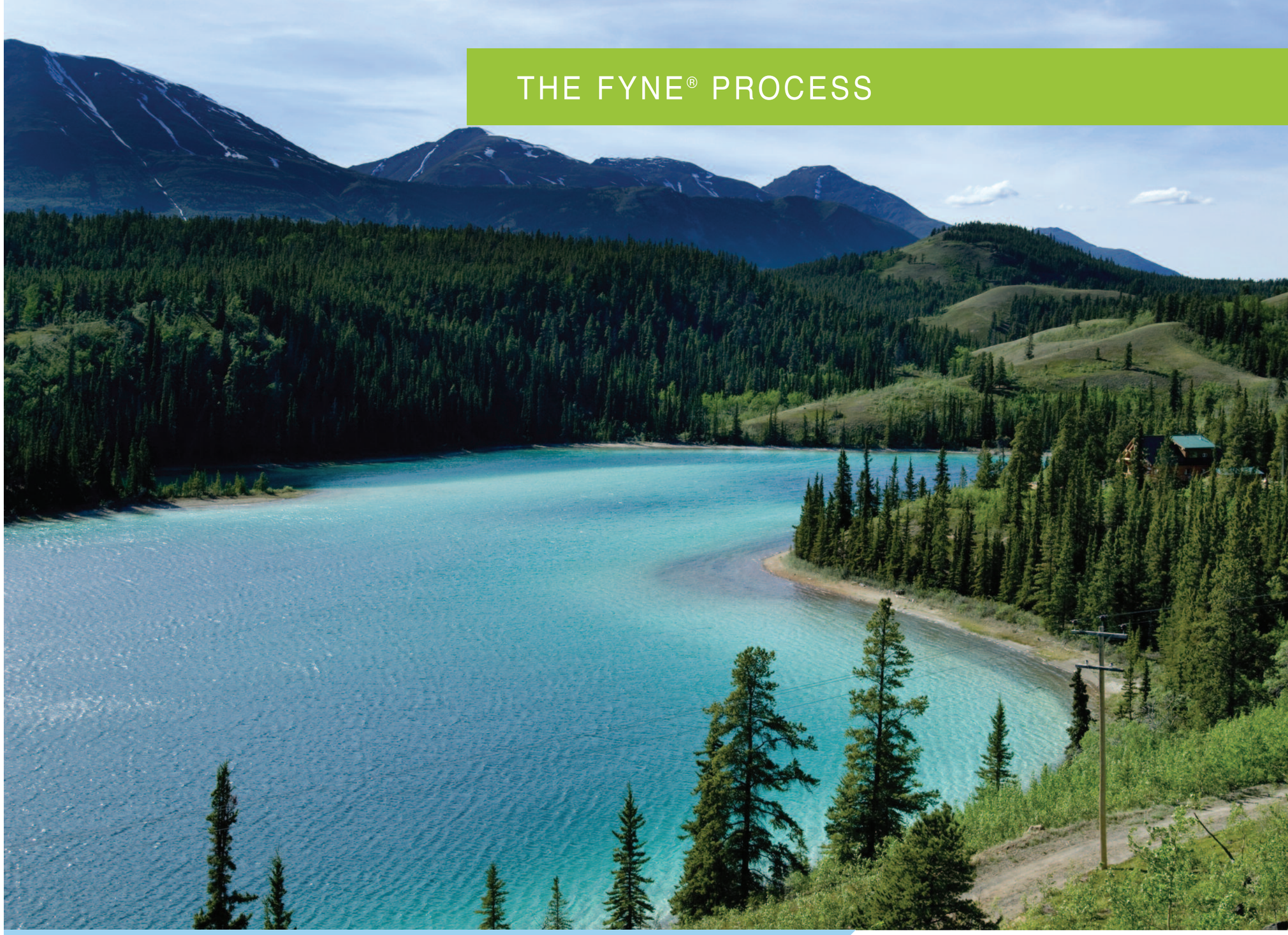

THE FYNE® PROCESS

TESTED AND CERTIFIED
WaterQuality ASSOCIATION
UNDER INDUSTRY STANDARDS
®

C USA

The C10 module and membranes used in the Fyne® System have been tested and certified by WQA against NSF/ANSI 61. Refer to the WQA website (www.wqa.org) for use restrictions.

Membrane SPECIALISTS

Membrane Specialists LLC
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Membrane SPECIALISTS

Harrington Harbour, Quebec, home to one of our Fyne systems, is located on the Gulf of St. Lawrence. Photo by: Robert Costain.

THE SIMPLE SOLUTION TO DELIVERING POTABLE WATER FROM SURFACE SOURCES IN REMOTE LOCATIONS

The Fyne Process is a simple, environmentally friendly system that employs advanced membrane filtration technology to treat poor-quality surface water.

It is particularly well suited to treating water containing carbonaceous organic color and pathogens like Cryptosporidium, typically found along the rocky Canadian Shield, in Alaska, and in the northern U.S.

Fyne filtration systems have been running successfully at more than a dozen locations in North America since February 2000. Systems have been installed in Nova Scotia, Newfoundland, Quebec, Ontario, the North West Territories and British Columbia in Canada, and multiple sites in Alaska.

The Fyne Process has repeatedly been proven to provide the lowest capital and operating costs (lowest life cycle cost), especially in small- to medium-sized systems. Thus, it offers an ideal solution for remotely located communities, campgrounds and mining and oil services camps.

THE FYNE PROCESS PROVIDES A FILTRATION BARRIER TO THESE (AND OTHER) CONTAMINANTS:

- Organic carbon - the principal pre-cursor leading to the formation of regulated disinfection by-products (e.g. carcinogenic THMs & HHAs).
- All regulated pathogens, including bacteria, protozoan cysts (e.g. Cryptosporidium) and viruses.
- Numerous metals, including iron, aluminum and manganese.
- Turbidity, suspended solids and algae.

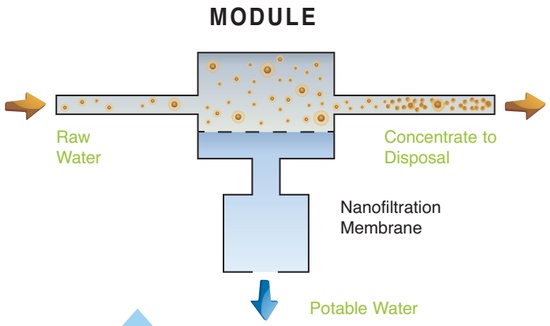
MEMBRANE FILTRATION: HOW IT WORKS

The Fyne Process employs tubular membranes because of their ability to handle suspended solids without fouling. Raw water is pumped at high speeds and under pressure through the modules. The pressure forces some of the water through the membranes where it is collected for further processing into drinking water.

Organic matter and pathogens are retained and swept through the system by the high-velocity crossflow circulation. Water recirculates continuously producing clean water that permeates through the filter, while organic material and other contaminants are simply washed back to their source.

IN CONTRAST TO CONVENTIONAL FILTRATION OR CHEMICAL COAGULATION, MEMBRANE FILTRATION HAS MANY ADVANTAGES:

- **Almost no impurities** are left behind to blind the filters, so filtration efficiency is maintained, even in the case of sudden or substantial changes in the volume of impurities in the source water.
- The system **does not produce chemical-bearing sludge** the way coagulation processes do. There are no costly removal, re-processing or disposal concerns.
- Since chemical addition is required only for **cleaning, typically 3-4 times per year**, chemical delivery and storage costs are all but eliminated. There are no chemical-related health, safety or environmental concerns.
- **Manpower and maintenance requirements are minimal**. The system operates automatically. Operators require no special skills or training and, most of the time, the system operates unattended.
- **Operator involvement is required only to monitor the plant**, batch post-filtration chemicals, take regular samples and, once or twice each year to chemically clean the membranes.



Raw water is pumped at high speeds and under pressure through the membrane tubes. Water permeating through the membranes is collected for processing into drinking water, while organic matter and pathogens are swept away by the high-velocity crossflow circulation and returned to the water source.

Module cross-section showing tubular membranes

Typical Fyne Process installation.

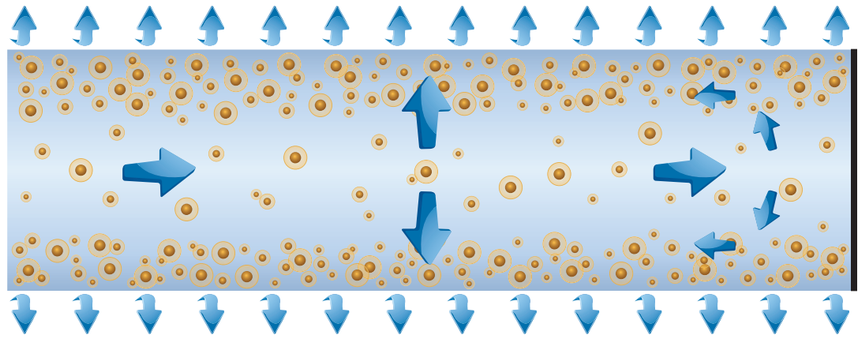
EASY MEMBRANE CLEANING

The membranes are routinely cleaned using a mechanical pigging technique employing natural foam rubber balls. After a predetermined operational time period the plant's flow direction is automatically reversed, causing the balls to be squeezed along the length of the membrane tubes, scouring accumulated deposits from the filtration surface.

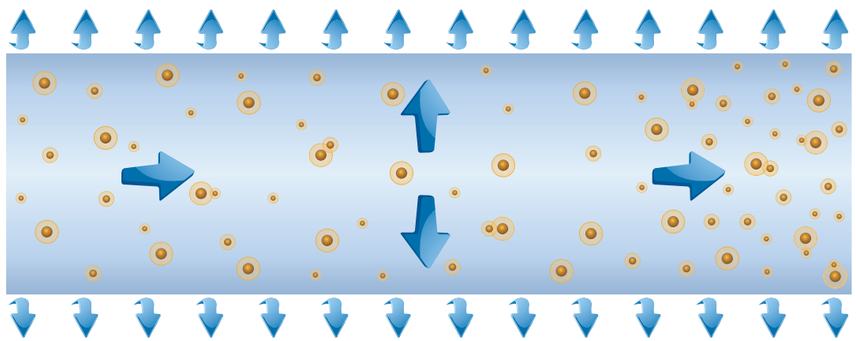
The removed deposits are gradually disposed of via the waste stream to the local water source. This unique feature makes the Fyne Process more environmentally friendly than any conventional treatment alternatives.

Cleaning tubular membranes is made easy by automatic foam-ball pigging.

"DEAD END" FILTRATION



"CROSSFLOW" MEMBRANES



Dead end filtration retains all filtered material, which gradually blinds the filtering membranes, reducing efficiency and requiring intensive cleaning. In crossflow membrane filtration, the continuous, high-velocity flow sweeps solids back to the water source so efficiency is maintained and cleaning requirements are minimal.

“BEST TASTING WATER”

The Lower Kuskokwim School District (LKSD), located near Bethel, Alaska, has been able to depend on the Fyne Process to provide drinking water to many of its schools. Situated in the remote Alaskan tundra, LKSD previously had to depend on coarse filtered rainwater to supply drinking water to the schools. Inadequate supply and the fact that the water did not meet the standards of the EPA’s Stage 1 D/DBP rule meant that it was necessary to find a new system. With its compact size and minimal maintenance requirements, Fyne was the perfect fit. Using rain catchment supplemented by surface water, the Fyne system today provides clean, delicious drinking water for 12 of the schools in the district. The water is so delicious, in fact, that shortly after installation in the Kipnuk School the National Rural Water Association named LKSD the winner of the Annual Great American Drinking Water Taste Test.

Aerial view of Kipnuk, Alaska, site of one of the Fyne Process installations used in the Lower Kushkokwim School District.

Exterior and interior view of the trailer that houses the Fyne Unit at the Chief Paul Memorial School in Kipnuk, AK.

PRODUCING HIGH-QUALITY WATER ACROSS NORTH AMERICA

Whether it's in Ontario or Alaska, on the coast of Nova Scotia or in a remote North Dakota oil camp, water drawn from surface sources usually has high organic content. This is evidenced in color and turbidity, as well as high levels of metallic elements like iron, manganese and aluminum. Organic levels also vary with snow melt, summer drought and other factors.

The Fyne membrane-filtration process was specially designed for waters like these and it has been proven repeatedly to deliver fresh-tasting drinking water that meets the strictest quality and safety standards in North America. It produces water that easily meets the Disinfection By-Product standards set by the stringent U.S. Environmental Protection Agency's Stage 1 D/DBP Rule and the highest standards of filtration required by the LT2eSWTR rule in Canada. The Fyne System and its components also have been tested by the Water Quality Association and awarded the Gold Seal signifying compliance with NSF/ANSI 61, which governs water-treatment and – distribution products used by municipalities in both the U.S. and Canada.

The table to the right shows water-quality improvement using the Fyne Process to filter tundra water near Barrow, AK.

THE MINI-FYNE PROCESS

The Mini-Fyne system delivers the same capabilities and benefits as a full-size Fyne unit, but does so in a size and configuration that is ideal for installations where small volumes of drinking water are needed.

Mini-Fyne systems are designed for remotely located schools, campgrounds, and mining and oil services camps, where small volumes of drinking water are needed but only poor surface water sources are available. They offer the same capabilities and benefits as full-size Fyne systems in a compact, fully integrated configuration.

Units can be transported easily by trailer for quick, easy installation and start-up wherever they are needed. Only single-phase power and a feed-water source are required. They can operate continuously unattended or on a start/stop on-demand basis.

Several different models are available with capacities that range from as little as 240 to as much as 2525 gallons/day (900 to 9550 liters/day).

Mini-Fyne: Clean, safe drinking water in a compact, portable package.

WATER QUALITY – BARROW, AK: TUNDRA WATER SOURCE

	Feed Water Max	Average	Filtrate Max	Average
Colour (CPU)	197	124	13	4.46
TOC (mg/l)	16	15	1.2	0.7
Turbidity (NTU)	4.5	3.4	0.165	0.056
UV $_{254}$ (cm^{-1})	1.53	0.52	0.032	0.012
TTHM μg/l*	605	544	46	31
HAA5 μg/l**	480	405	11	6.7
SDI	17.9	9.49		
Iron (mg/l)	1.4	1.2	<0.025	<0.007
Total Hardness (mg/l)	79	75	43	40
Manganese (mg/l)	0.15	0.12	0.06	0.05
TDS (mg/l)	320	298	200	195
TSS (mg/l)	1.5	1	<2	0.9

*EPA Method 502.2
**EPA Method 552.2

THE GREEN SOLUTION

If you live or work in an environmentally sensitive region, the last thing you want to do is import large quantities of chemicals or dispose of the contaminated sludge generated by coagulation processes. That's why the Fyne Process is the perfect alternative. The only byproduct of the system is a slightly more concentrated form of the raw water, which can be returned to its source without any environmental consequences. And, the membranes themselves only need to be chemically cleaned once or twice a year. When you live in harmony with nature, you will want a water system that does too.

The Fyne Process is an ideal solution for drinking water in environmentally sensitive areas like this one on the Alaskan North Slope.