RESCUE RANGER

Delivering Hope, One Ride at a Time

Rescue Ranger Water Purification Unit

The **Rescue Ranger Water Purification Unit** will consist of a Rescue Ranger Sidecar fitted with a utility-style box housing a mobile water purifier. It will feature several fill-up points mounted directly on the unit. Designed to make unsafe water safe for human consumption, it can also provide emergency water relief during outbreaks. The unit will be equipped with a 20m suction hose and a 30m supply hose, enabling access to most water sources. It will operate completely independently, powered by its own energy source.

Water will first pass through a large-solids filter, then through triple-housing pre-filters, before entering the 0.02micron 4040 ultra filter, which removes around 99% of impurities. This process is vital in regions where waterborne disease outbreaks are causing illness or death. Spare filters will also be supplied.

By delivering clean drinking water to communities in desperate need—particularly those suffering from illness and poor health due to waterborne diseases and impurities—this unit will greatly improve health, save lives, and reach even the most inaccessible regions.

UF Membrane 4040 Water Treatment System

A 4040 ultrafiltration (UF) membrane filter can remove a wide range of waterborne contaminants, but it does not remove all waterborne contaminants. It is effective at removing particles, bacteria, and larger organic molecules, including some viruses. However, it typically does not remove dissolved salts, minerals, or smaller organic molecules.

Here's a more detailed breakdown:

What it removes:

Fine sediment and particles: UF membranes have a pore size that can filter out particles down to 0.02 microns, which includes many types of sediment and particulate matter.

Bacteria: UF membranes effectively remove bacteria like E. coli and Legionella.

Larger organic molecules: These can include proteins and other larger organic compounds.

Some viruses: While not all viruses are removed, UF membranes can remove a significant portion, especially those associated with larger particles.

What it doesn't remove:

Dissolved salts and minerals:

UF membranes allow dissolved substances to pass through, meaning they don't change the mineral content of the water.

Smaller organic molecules:

Dissolved organic molecules smaller than the membrane's pore size will pass through.

In summary: A 4040 UF membrane is a robust filter for many common waterborne contaminants, but it is not a complete solution for all water purification needs. If you need to remove dissolved substances or very small viruses, you may need additional filtration steps, such as reverse osmosis.

Waterborne Disease

Waterborne disease outbreaks occur when pathogens (like bacteria, viruses, or parasites) contaminate drinking water or recreational water sources, leading to illness. These outbreaks can cause a range of illnesses, from mild gastroenteritis to more severe conditions like cholera and typhoid fever. Factors like unsafe water supplies, inadequate sanitation, poor hygiene, and extreme weather events can contribute to outbreaks.

Common Waterborne Diseases:

Gastroenteritis: A common illness causing diarrhoea, vomiting, and stomach cramps.
Cholera: A severe diarrheal disease caused by the bacterium Vibrio cholerae.
Typhoid Fever: A systemic illness caused by Salmonella typhi.
Hepatitis: Inflammation of the liver, potentially caused by various viruses.
Cryptosporidiosis: An infection caused by the parasite Cryptosporidium.
Giardiasis: An infection caused by the parasite Giardia.

Factors Contributing to Outbreaks:

Contaminated Water Sources: Untreated or poorly treated water from rivers, lakes, or wells can be a source of pathogens.
Inadequate Sanitation: Improper disposal of human waste can contaminate water sources.
Poor Hygiene: Lack of handwashing and other hygiene practices can spread pathogens.
Extreme Weather Events: Floods and heavy rainfall can overwhelm water treatment systems and contaminate water supplies.
Defective Water Distribution Systems: Leaks, breaks, and poor maintenance of pipes can introduce contaminants.
Cross-connections and Back Siphonage: Improper connections between potable and non-potable water lines can introduce contaminants.

Examples of Outbreaks:

Milwaukee Cryptosporidium Outbreak:
A large outbreak in Milwaukee, Wisconsin, in 1993, was linked to Cryptosporidium contamination of the city's drinking water.
Ship-related Outbreaks:
Numerous outbreaks have occurred on passenger ships due to contaminated water, often involving Enterotoxigenic E. coli, noroviruses, and other pathogens.
Rural Community Outbreak:
A rural community experienced an outbreak of Campylobacteriosis linked to a contaminated groundwater source and issues with the water distribution system.

Prevention and Control:

Safe Water Treatment: Proper disinfection of drinking water is crucial, especially chlorination.
Sanitation Improvements: Investing in proper sewage treatment and waste management is essential.
Hygiene Education: Promoting handwashing and other hygiene practices can reduce the spread of pathogens.
Monitoring and Surveillance: Regular monitoring of water quality and surveillance of waterborne diseases are important for early detection and response.
Infrastructure Improvements: Investing in reliable water distribution systems and preventing cross-connections and backflow are important.
Water Safety Plans: Implementing comprehensive Water Safety Plans can help ensure the safety of water supplies from source to consumption.

4 Berkhout Street
Sweetwaters
King Williams Town
Qonce
5600
South Africa
Tel: +27(0) 406551641
Email: info@rescueranger.co.za
Website: https://rescueranger.co.za

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Unit 16 Industrial Park
7 Bert Kipling Street
Wilsonia
East London
5247
South Africa
Tel: +27(0) 406551641
Email: info@rescueranger.co.za
Website: https://rescueranger.co.za