



Product Data Sheet

HIX™-100

HIX-100 is a hybrid blend of strong acid cation exchanger loaded with hydrated iron oxide nanoparticles and nanoparticles loaded organic granules. HIX-100 resin blend is suitable for selective removal of high levels of dissolved iron, control of hardness, control of chlorine, and partial removal of arsenic species. The parent resin has macroporous polystyrene matrix with divinylbenzene cross-linking. The blend is capable of operating under a wide range of pH conditions. Its porous structure offers good operating performance and reversible removal of particulates.

Physical & Chemical characteristics:

Appearance	Spherical beads, Black/grey
Particle size	0.3 – 1.2 mm
Functional group	Sulphonic acid
Supplied ionic form	Iron/Na+
Approx shipping wt.	600– 625 /L
Temperature limit	60 °C
pH range	0 to 14
Operating capacity (Iron)	5 - 6 gm/kg

Application and Bed features:

The bed of HIX-100 is required to be re-conditioned periodically/ intermittently once the capacity is depleted.

Recommended Contact time*	2 – 4 min
Service flow	Intermittent/ Continuous
Operating pressure	20 – 75 psia
Regeneration solution	<i>HIX-Nano Salt</i> solution (2-8%)

Safety:

Acid or acidic solution used for re-conditioning of the resin are corrosive and these should be handled with proper care to avoid any contact with eye, skin or other parts of body.

Quantity to be selected carefully based on detailed water quality and intrinsic features of treatment process

DRINKWELL® HIX™ 100 (Iron Removal Media)

Introduction:



In India, development and synthesis of HAIX-NanoFe (and HAIX-NanoZr) was initiated with funding from the government of India's Department of Science and Technology (DST) and the US State Department through active collaboration between the Society for Technology with a Human Face or STHF, an NGO in India and WIST Inc., a technology-driven social enterprise.

The primary intent was to deliver a robust adsorbent to mitigate severe arsenic and fluoride crisis in the Indian subcontinent directly threatening lives of nearly 200 million resource-poor people. HAIX-NanoFe is essentially a porous polymeric anion exchanger inside which hydrated ferric oxide nanoparticles have been irreversibly dispersed. Its high arsenic removal capacity and regenerability through the use of the Donnan Membrane Principle stand in agreement with the original study by Prof Arup SenGupta in Lehigh University, USA. HAIX-NanoFe is a hybrid polymeric-inorganic material where both polymer and inorganic phases complement each other resulting in enhanced capacity, durability, chemical stability and reusability through regeneration for multiple cycles.

Aside from robustness and durability compared to other inorganic commercial adsorbents, namely, activated alumina, granulated ferric oxide etc., HAIX-NanoFe is capable of recovering nearly 99% of the groundwater treated i.e., only 1% of the water drawn from underground is wasted. In contrast, for competing reverse osmosis (RO) processes, nearly 40% of the water is routinely wasted. HAIX-NanoFe is also capable of removing uranium, phosphate and chromate concurrently. Since HAIX-NanoFe can be regenerated and reused safely for at least five cycles, the overall cost of the treated water per 1000 litres is less than other competing processes. It has been demonstrated through multiple field-scale studies that disposal of spent regenerant and HAIX-NanoFe poses no environmental threat and satisfy TCLP (Toxicity Characteristic Leaching Procedure) requirements.

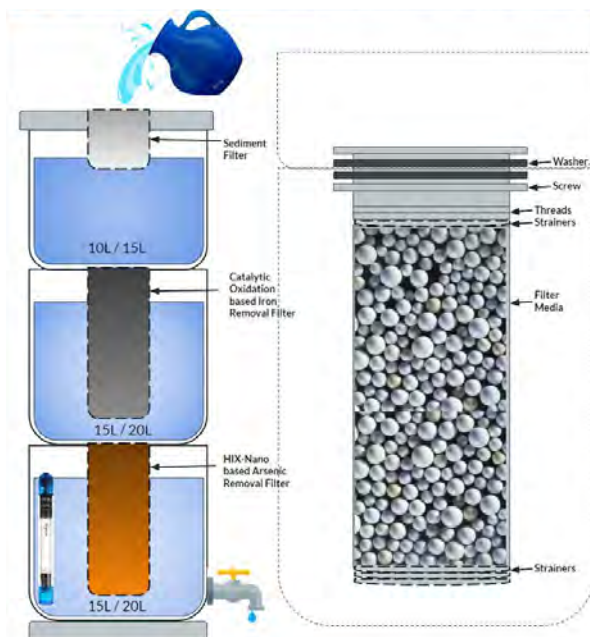
In India, HAIX-NanoFe and HAIX-NanoZr are in use in plants funded by WB PHED, Tata Trusts, Clinton Foundation, Bihar PHED and multiple NGOs. Several community-based plants have been in operation well over ten years.

Features:

1. Technology patented in the USA
2. CSIR approved in India
3. Efficiently remove Iron (Fe^{++} & Fe^{+++}) till 10 ppm
4. Regenerable media
5. Low energy consumption
6. Pump and gravity-fed system
7. Operating pressure range 15-75 psia
8. Low wastage of water
9. No leaching of Iron observed from media bed during filtration, backwash & rinse.
10. Easy for Sludge Handling
11. Gives good results till 10-12 cycles, even more, depending on the operation
12. Rapid adsorption kinetics
13. Low-pressure drop
14. Cost-Effective Treatment

System Designs:

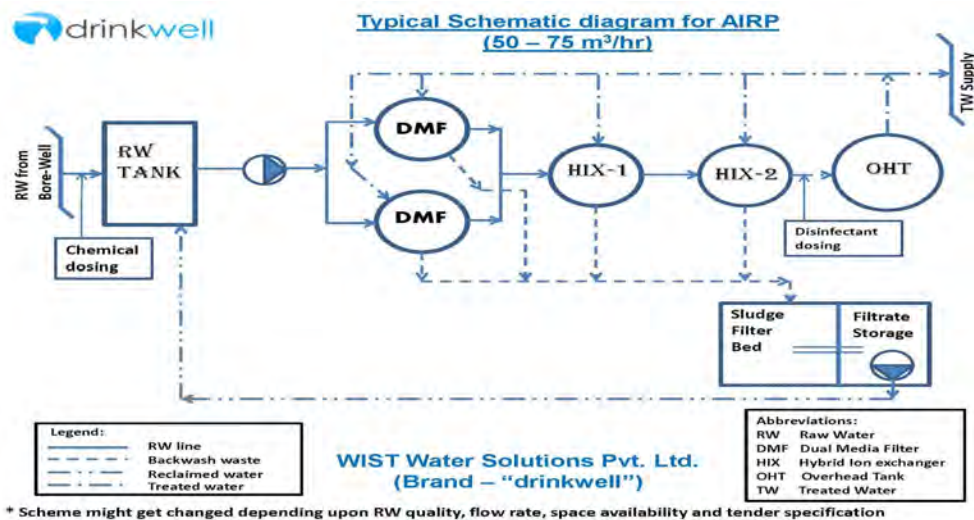
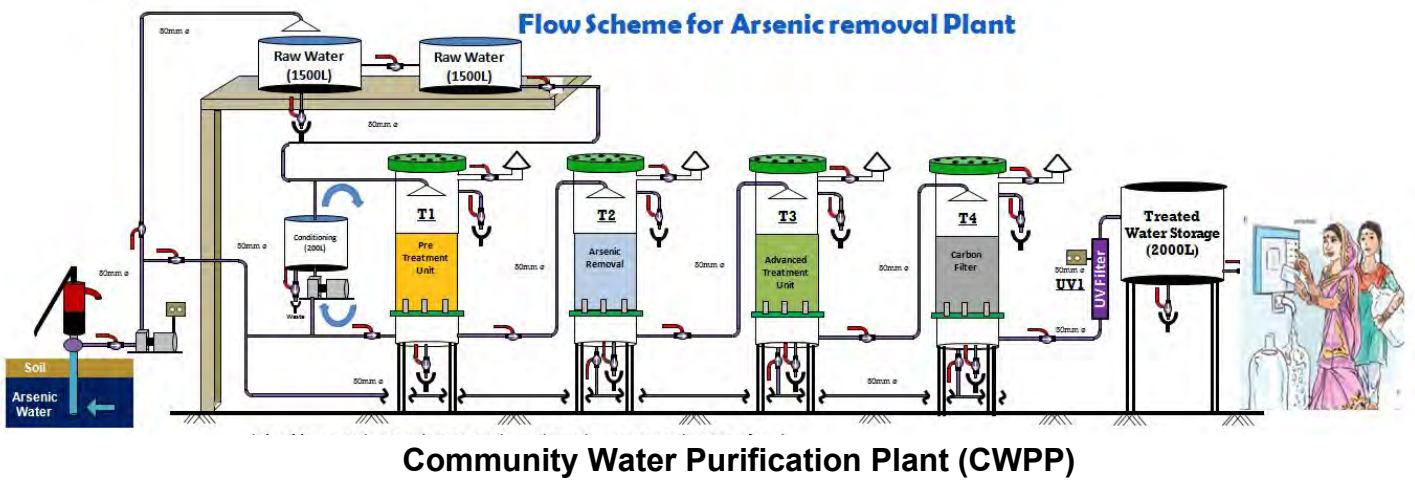
- Point of Use Filter (POU)
- Point of Entry Filter (POE)
- Community Water Purification Plant (CWPP)
- Piped Water Supply System (PWSS)



Point of Use (POU)



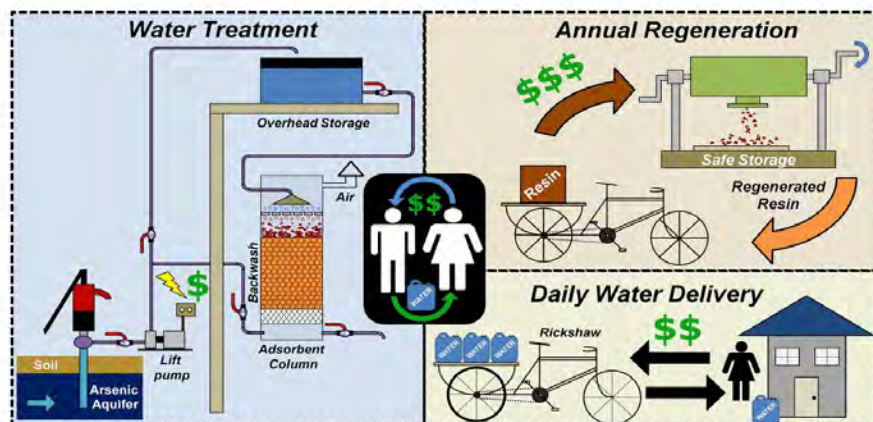
Point of Entry (POE)



Piped Water Supply System (PWSS)

Reject Management System:

Water Ecosystem Overview



HIX-Nano100+ Calculator:

Flowrate in LPH	500
Iron (Fe) in mg/l	5
Total Arsenic (As) in ppb or µg/l	100

SUBMIT

• Drinkwell Recommendations

Pre-Filtration media type	Filter Sand or Green Sand
Pre-Filtration media required	100-150L
Pre-Filtration Freeboard	25-30%
Pre-Filtration Required vessel volume	16*65
HIX™ 100 media required	100-200L
HIX™ 100 Freeboard	25-30%
HIX™ 100 Required Vessel Volume	18*65
HIX™ 100 Filtration Rate	8
HIX™ 100 EBCT	6

*This calculator has been designed based on real-time data obtained from system installation worldwide.

*The contamination concentration and the filtration rate is a best-fit approximation and is subject to be updated.

*This calculation is only a recommendation for system design. Please do not forget to read and follow the instructions given in our HIX-Nano100 product literature.

Comparisons:

Basis	HIX™ 100	BIRM	MNO2
Material	Hybrid Resin Bead	Granular	Granular
Chemistry	Hydrated Iron Oxide	Hydrated Iron Oxide	Iron Oxide
Min. Contact time	2 min	3 min	3 min
Arsenic Residuals	No Residuals or Fines	Yes- Backwashed Fines	Yes- Backwashed Fines
Disposal	Regenerable or Reusable	Landfill	Landfill
Regenerable	Yes	No	No
Waste Handling	2kg of toxic sludge(solid) soak pit arrangement.	100kg of solid waste for each replacement	100kg of solid waste for each replacement

Technical Data:

- Physical Properties

Appearance	Dark Brown spherical beads
Mesh Size	0.3 - 1 mm
Uniformity Coefficient	1.34 - 1.78
Bulk Density	0.72 - 0.75 kg/m ³
Removal Capacity	3-12 gm/L
Moisture Content	45 - 50%
Specific Gravity	1.2 g/ml
Shipping Weight	720 - 750 g/L
Porosity	Macroporous Beads

- Recommended Operating Conditions

pH Range	4.5 - 8.5
Max. operating Temperature	40 - 45°C
Max Differential pressure across the bed	0.4 - 0.6 bar/m
EBCT	2 - 4 min
Freeboard	25 - 30%
Min. bed depth	750 mm
Optimal Bed depth	1.250 mm
Service Flow	8-12 m ³ /hr m ²
Backwash Velocity	1000 LPH
Backwash Time	15 min
Rinse Time	10 min

DRINKWELL®HIX™ 100 Case Studies:

India Rural Arsenic Case Study: Kothora Village, Assam



Drinkwell Arsenic Iron Removal System (Est. May 2017)

<i>Location</i>	Kothora Village, Nalbari District, Assam
<i>Google map coordinates</i>	26.41368, 91.49664
<i>Capex Sponsor</i>	Tata Trusts
<i>Operating Partner</i>	Gram Vikash Mancha
<i>Households Served</i>	200- 300
<i>Capacity</i>	5000 - 6000 Liters Per Day
<i>Impurities</i>	Arsenic (Raw: 240 ppb Treated: 1 ppb) Iron (Raw: 2.10mg/L Treated: 0.24 mg/L)
<i>Daily Avg of Ls Sold</i>	4,650
<i>Operation & Maintenance Capabilities</i>	- ATM dispensing system - Water Dispense Monitoring via Sensors



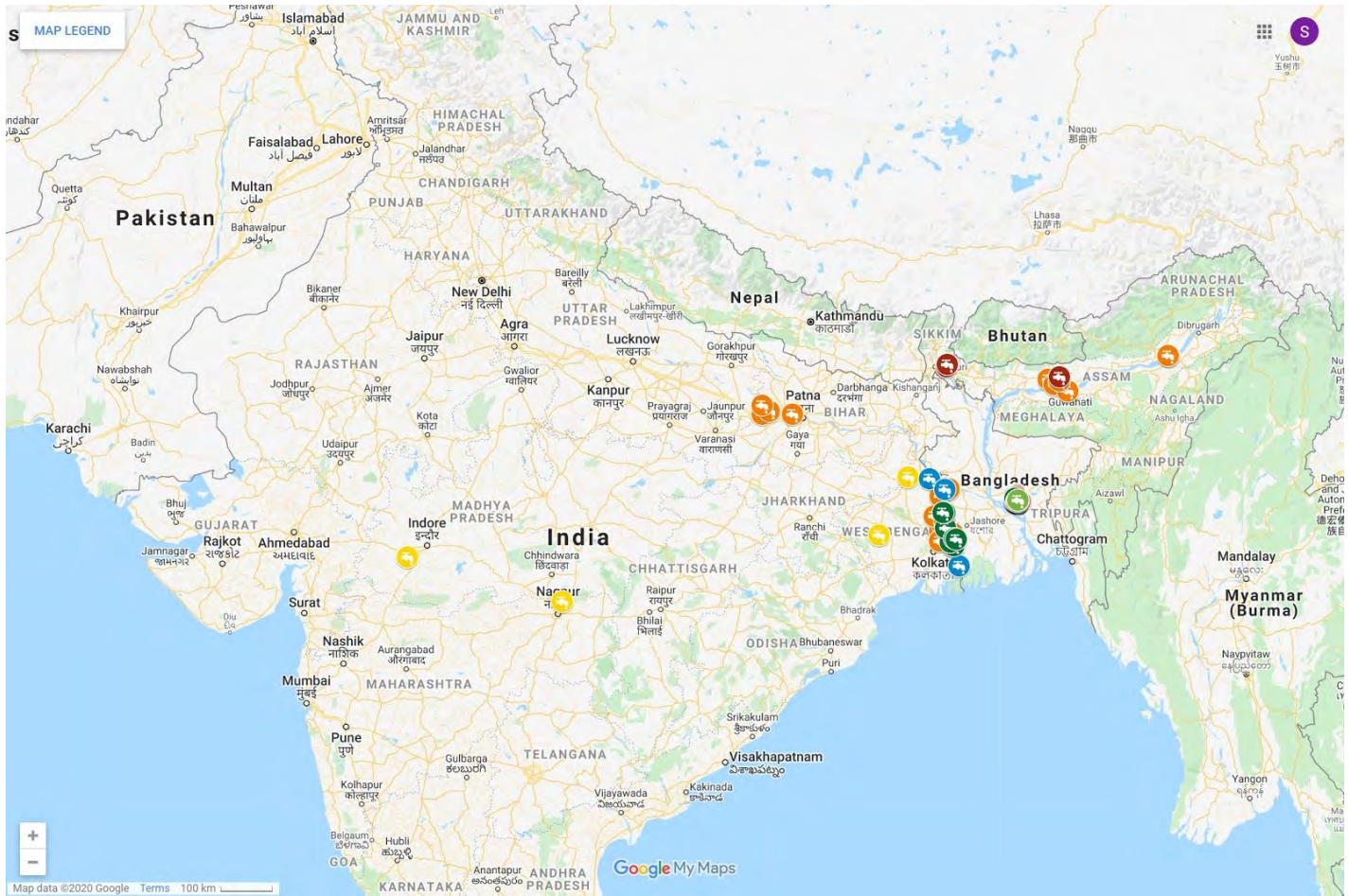
Bazitpur Arsenic Mega Project



Drinkwell-RiteWater Arsenic & Iron Removal PWS (Est. July 2016)

<i>Location</i>	Bazitpur Village, Basirhat Block, North 24 Parganas, West Bengal
<i>G-Map coordinates</i>	22.71649, 88.85703
<i>Capex Sponsor</i>	West Bengal PHED
<i>Operating Partner</i>	RiteWater
<i>System Type</i>	Piped Water Supply scheme
<i>Capacity</i>	92000 Litres Per Hour
<i>Impurities</i>	Arsenic (Raw: 0.2 mg/l Treated: <0.002 mg/l) Iron (Raw: 0.62 mg/L Treated: <0.1 mg/L)
<i>Daily Avg of Ls Dispensed</i>	370000 litres

DRINKWELL® HIX-Nano™ installations in India



URL: <https://bit.ly/2yhKgUm>