

ART SAND Process™

NANOTECHNOLOGY

FOR NATURALLY CLEAN WATER





ART CARBON s.r.o.
U Hřiště 418, Nehvizdy 250 81, Česká republika
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Offer example for potable water treatment, tertiary, 20l/s

1. Input parameters of raw water

ART SAND Process™ is designed for nominal capacity of 20 l/s (72 m³/h, 630.720 m³/year). Parameters of input water treated by flocculation and sand filtering are:

COD:

TOC:

Full assay according to local legislation:

Any specific problems to be addressed:

1.1. Design parameters of adsorption column

Water residence time: 70 s

Flow speed min. 10 m/h

2. Design of adsorption system

Adsorption column is designed as vertical set of 4 independent adsorption stages. It allows for easy and very economic column expansion in case water production need to be increased.

Individual adsorption stages are filled with patented adsorbent ART SAND type ASPP50 that is characteristic of broad-spectrum adsorption capability, fast adsorption kinetics (10x faster comparing to activated carbon). The volume of ASPP50 installed is 1,412 m³.

Column diameter is 1600 mm, height is 1750 mm, installation space is 2x2 m. Approximate weight of column with ASPP50 is 4 000 kg.

ASPP lifetime granted: 2 years.

Adsorption column filled with ART SAND is:

New ART SAND ASPP50: USD 25 500

*(just for comparison with GAC: 25 m³ GAC Filtrasorb TL830 would be needed, i.e. 12 t at costs of **USD 50 000 -60 000** once at 0,5-2 years, spent GAC disposal costs as dangerous waste USD 8 000)*



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3. Disposal of spent ART SAND

Adsorbent ART SAND is taken back by ART CARBON company for recycling or disposal for free.

4. Piping and valves

Mains are made of stainless steel of DN150 (flow speed 1,13 m/s) or DN200 (flow speed 0,63 m/s). Individual adsorption stage drain is DN50 (2"). Outputs from individual adsorption stages into collector main is via flexible fast speed mount.

5. Adsorbent regeneration

The adsorption column is equipped with terminals for connection of external regeneration system. Regeneration period is dependent of organic impurities content in incoming water. In case of standard ground water source regeneration period is expected to be each 4 months. Regeneration takes 4-8 hours and during this time, the column is set to bypass.

Regeneration is performed as service by external company and usually costs USD 0,012 per cubic meter of purified water. External company secures regeneration, transport of regenerate and back column commissioning within one working shift.

Regenerant volume 1 500 l.

Cost of service: USD 0,012/m³ of water purified.

6. GSM MikroMarz monitoring system

This system is designed to collect important data on amount of treated water remotely and on the base of input data parameters to determine right time for ASPP50 regeneration. Operators do not need to pay attention to this process as the system automatically alerts external company to perform regeneration.

GSM system is priced individually.

Proposed by: Ing. Martin Bouša, Ing. Daniel Bouša, PhD.

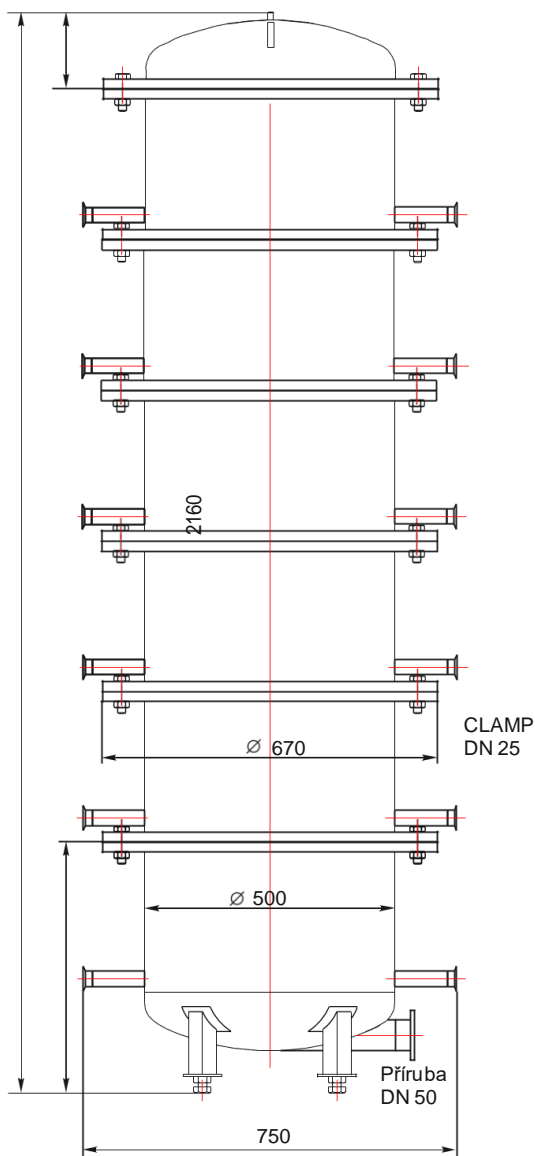
Datum: 20.7.2020



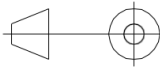
Validity: 3 months

**ART SAND Process AND ACTIVATED CARBON (GAC) COMPARISON
 FOR WATER TREATMENT CAPACITY 20 l/s**

Parameter	ART SAND Process	GAC
Plant water production	20,0l/s	20,0l/s
Flowrate	16m/h	7m/h
Adsorbent installed height	0,22m in for stages	1,2-1,5m
Adsorbent weight	0,75t	25t
Free height requirement	2,0m	3,5-4,0m
Floor space requirement	5m ²	30m ²
Regeneration costs including GAC loss, annually	USD 7 500	USD 60 000 including new GAC
No. of regeneration p.a.	3-4	None
Cost of adsorbent disposal	None	USD 8 000
On site regeneration	YES	NO
Removal of bacteria and viruses	YES	NO
Estimated investment in CZ	USD 400 000	USD 500 000
Operation costs calc. on base work, energy, consumables	USD0,013/m ³	USD 0,05-0,08/m ³
Adsorbent lifetime	2 years granted	0,5-2 years
Cost of new adsorbent	USD 25 500	USD 60 000č

Depiction of modular multistage adsorption column



POZNÁMKA:		 	
MAX.PRAC.TLAK:	0,1 MPa	ART CARBON s.r.o. U Hřiště 418, Nezdvihy IČ: 06423469	
MAX.PRAC.TEP.:	80 C°	VODASERVIS s.r.o. Jamská 53, Žďár nad Sázavou IČ: 26277841	
MEDIUM:	voda	MATERIÁL:	DIN 1.4301
KRESLIL:	Mgr. Martin Blažiček	NORMA:	
SCHVÁLIL:	Martin Bouša	POVRCHOVÁ ÚPRAVA:	balotínování
DATUM:	25.6.2020	ČÍSLO VÝKRESU:	MĚŘITKO:
NÁZEV:		1-901-098	
Filtr NFAC 500/6S		LISTŮ: 1 FORMÁT: A4	LIST: 1