

CAVITATION SCRUBBING SYSTEMS

Global Advantech's cavitation scrubbing systems are designed to maximise generation of hydrodynamic cavitation using water pumped at high pressure. Applications for cavitation scrubbing systems:

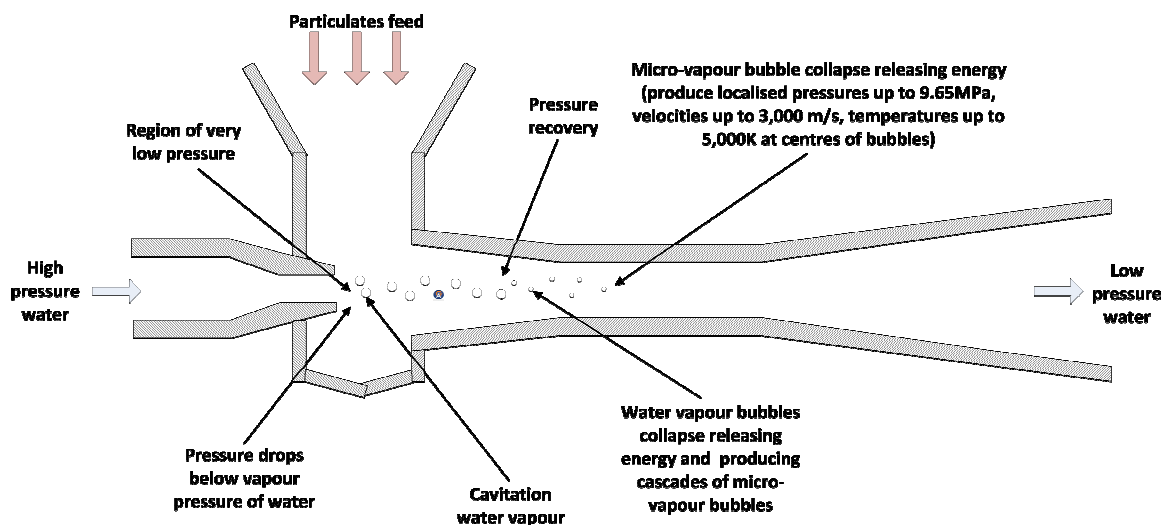
- Soil washing to separate and recover hydrocarbons from heavily contaminated soil and sand, e.g. at old oil refineries and storage depots, engineering works, former gasworks, after a crude oil spill offshore.
- Cleaning and recovering base oil from exploration/production well drill cuttings separated from oil-based drilling muds.
- Separation of fine particulates from aggregates in clay extraction.



CAVITATION

Cavitation is a physical phenomenon, it occurs when flowing water or another liquid is subjected to rapid changes of pressure. Vapour bubbles form in lower pressure regions of the water/liquid, when these vapour bubbles enter regions of higher pressure, they collapse. These collapses release significant amounts of trapped energy and produce shock waves, which exert localised pressures reaching 9.65Mbar. The collapsing vapour bubbles also generate high velocity micro-jets

of liquid (up to 3,000m/s), which impinge against hard particulates and surfaces in the immediate vicinity. In many situations cavitation can be highly destructive, damaging ships' propellers, pumps, valves, pipes, etc. However, cavitation scrubbing systems harness these energy releases and shock waves to efficiently separate hydrocarbons and fine particulates from larger solids.



Hydrodynamic cavitation generation

Global Advantech Limited

Exceptional clean technologies for a sustainable future.....

Energy House, 14 Maurice Close, Kimbolton, Cambridgeshire, PE28 0HD, United Kingdom
 t +44 (0)845 519 0159 / e enquiries@globaladvantech.com / www.globaladvantech.com

Cavitation Scrubbing of Solids and Applications

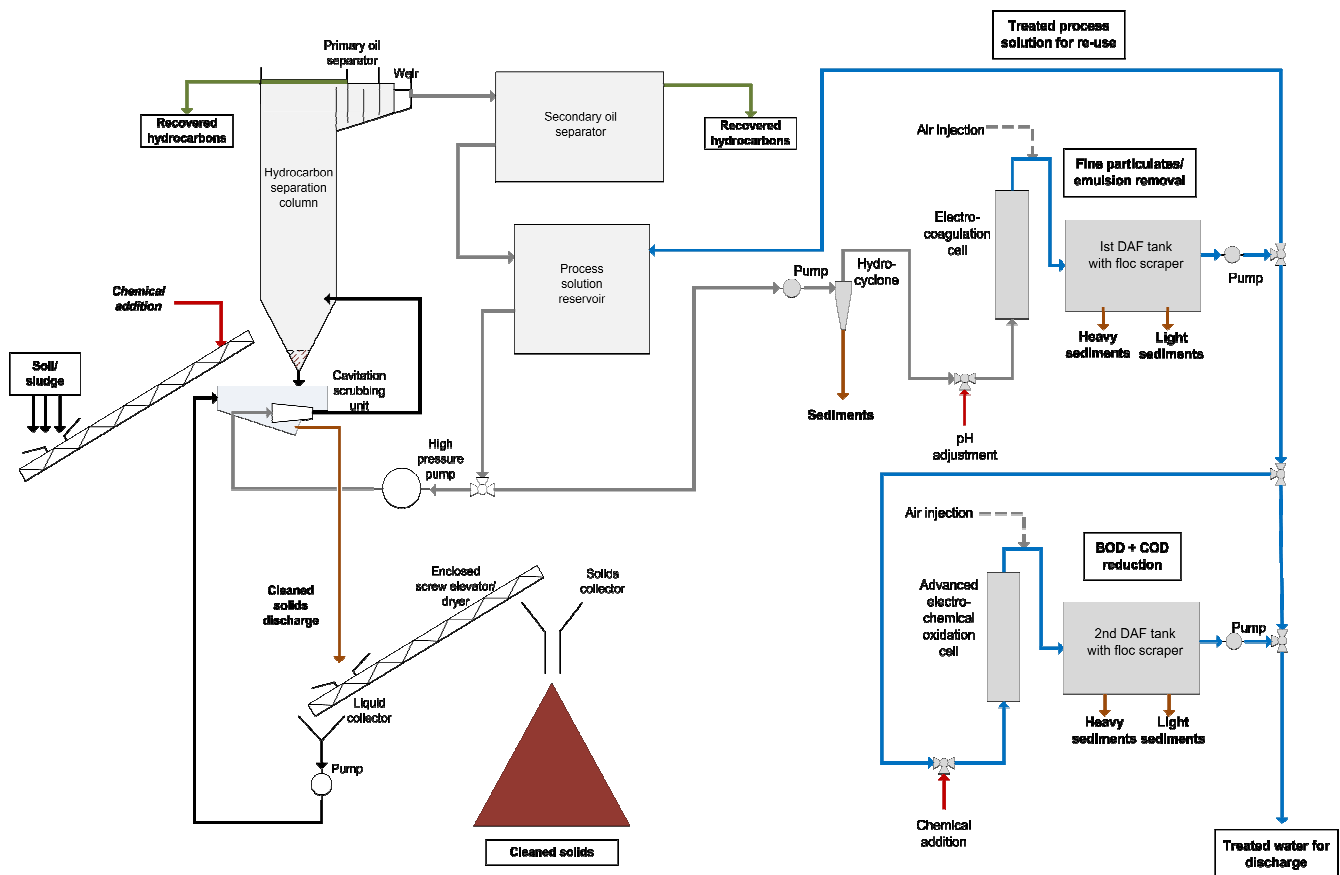
GLOBAL ADVANTECH'S CAVITATION SCRUBBING SYSTEMS

Global Advantech's cavitation scrubbing systems contain a number of innovative design features and benefits to ensure effective and continuous operation:

- Multiple cavitation stages in series to ensure complete removal of heavy hydrocarbons, bitumen and tars from solids.
- Multiple oil/hydrocarbon recovery stages.
- Water/process solution treatment plant to remove suspended solids, heavy metals and dissolved/emulsified hydrocarbons, etc. This enables the water/process solution to be continually recycled through the system. Global Advantech uses electrocoagulation systems in its water treatment plant. (See technology data sheet TDS801.)
- Sub-systems to drain and dry cleaned solids and recycle collected water/process solution residues.

- Chemical formulations available for pre-treatment of solid materials and to make up the process solutions. These formulations improve the rate of removal of heavy hydrocarbons, carbonised oils, etc. from contaminated materials.
- Mobile cavitation scrubbing systems available built into standard ISO-sized containers with integral bunds to prevent accidental release of process solution to the local environment.
- Water and air jet pumps available for loading cavitation systems directly from stock piles or the bottoms of storage tanks, interceptors, etc., a distance away from the system.

The schematic diagram for one of Global Advantech's cavitation scrubbing systems used for soil washing or hydrocarbon recovery from sludges is given below.



Cavitation Scrubbing System with Process Solution Treatment and Recirculation

Cavitation Scrubbing of Solids and its Applications

APPLICATIONS FOR CAVITATION SCRUBBING SYSTEMS

Application	Separation of hydrocarbons and particulates	Separation of fine particulates and larger solids	Solubilising heavy metals, arsenic
OIL + GAS			
Oil-based mud drill cuttings clean-up and base oil recovery	✓	✓	
Treating scale/NORM** deposits prior to cement encapsulation	✓	✓	
Recovery of hydrocarbons from production waste sludges, storage tank bottom sludges, interceptor sludges, etc.	✓	✓	
Cleaning and recovery of refinery cracking catalysts	✓	✓	
Environmental clean-up and hydrocarbon recovery from well-sites, waste lagoons, etc.	✓	✓	✓
Clean-up of beaches after oil-spills	✓		
MINING + MINERALS			
Minerals processing, ore separation		✓	✓
Mineral recovery, clays, etc.		✓	✓
Cleaning sand and aggregate		✓	✓
METALS PROCESSING			
Cleaning iron, steel mill scale, particulates from furnaces, etc.	✓	✓	
Cleaning scrap metal fragments, swarf, turnings, millings, etc.	✓	✓	
MARINE + TRANSPORT			
Cleaning silt from ports, harbours	✓	✓	✓
WASTE MANAGEMENT			
Cleaning and separating reclaimed materials from landfill sites	✓	✓	✓
Cleaning interceptor waste from roads, petrol station forecourts, airport runways, etc.	✓	✓	
WASTEWATER TREATMENT			
Treatment cleaning material from filter beds	✓	✓	
SOIL REMEDIATION			
Engineering works, power stations, former gasworks, oil refineries, distribution depots, etc.	✓	✓	✓

**Naturally occurring radioactive materials