Behaviour classes	Behaviour in the environment	Environmental and public health impacts	Organisms/species most affected
Gases (G) and Evaporators (E) (e.g. Ethylene oxide (GD - Gas/Dissolver); benzene (E))	Likely to contaminate air, may form a vapour cloud or plume. The vapour cloud behaves in the same way for E and G. G and E tend to dissipate with the current and the wind as they evaporate. Dense gases (heavier than air) will disperse much more slowly than gases that are lighter than air. The concentration of these substances tends to zero in the aquatic environment after some time.[1]	Vapour or gas clouds can be **toxic** and/or form a **flammable** or **explosive** mixture with air. Only **acute effects** are likely and only in the case of substances with a high toxicity because the exposure time is frequently short for these substances. Hence, they **usually represent a low threat** to the **marine environment** except if they also dissolve in water. **Possible effects** caused in **humans** by exposure to toxic substances/clouds: ✓ Slight irritation, watering of the eyes and choking; ✓ Serious irritation; ✓ Reversible or irreversible damage to health; ✓ Death. E.g.: Inhalation of a G or E by humans (or marine organisms) on or near the water surface can lead to **respiratory toxicity** or **carcinogenicity**. Therefore, there may be potential human health and safety implications. **Main hazards:** Air toxicity; Explosivity	**Wildlife** (e.g. seabirds) **Humans** (principally through inhalation exposure - greatest hazard)

[1] **Example**: in the case of *Samho Brother* incident (West Pacific Ocean, 2005), where the ship capsized and sunk 70 m deep, no benzene (highly toxic to flora and fauna) was detected later, neither in the air, water or in the shore.

Floaters (F) (e.g. pentylbenzene)	F tend to drift with the wind (generally blows faster than currents) and/or currents and therefore spread quickly over the water surface. They will spread under the effect of gravity to form a slick in a similar way to oil. However, unlike oil they may not be visible on the water. They stay on the water surface for a certain period of time.	F can reach and impact sensitive areas along the coast. They pose a higher potential risk to neritic and intertidal zones that typically have a high biodiversity. In the latter case, hard and soft sediments are affected in beaches and shores. In the open ocean, floaters create a barrier on the surface for oxygen to dissolve, contaminating marine mammals when they come up for breathing and seabirds seeking food or resting. Further problems arise when a spill occurs in or reaches shallow waters or when it happens in the breeding season of birds and mammals. On tide pools and still water, floating chemicals prevent exchange and mixing of oxygen and CO_2 causing anoxic conditions. **Other possible effects:** ✓ External coating (birds); ✓ Direct toxic action to marine organisms; ✓ Restriction of recreational and water supply uses. **Main hazards:** Fire / Flammability; Persistence; Hindrance They pose little threat to the human population as long as they float on the water surface. However, they have the potential of dermal exposure for **humans**.	**Aquatic organisms** and **wildlife** at the surface – Examples: - Marine mammals - Seabirds - Neuston and Pleuston organisms - Intertidal benthic organisms

Dissolvers (e.g. acrylonitrile (DE - dissolver/evaporator)	Readily solubilise in seawater and the steady state concentration will reflect the amount released, solubility, volume of water, dispersion, currents and wind velocity. Therefore, in case of a spill event, the concentration of dissolvers in the water is not constant and will decrease over time due to dilution in the water. Dilution of chemicals in estuaries and seawater is predominantly dictated by oscillations from wind and tide currents. The concentration in the water depends primarily on the mixing capacity (dilution rate) of the water body.	Environmental impact is localized in time and space (most evidences). **High acute toxicity** risk as they disperse easily and become bioavailable for aquatic organisms, at all levels of water column. In sensitive ecosystems and shallower waters, the direct and indirect reactivation of toxic metals and persistent organic chemicals adsorbed in the sediments, causing longer-term effects, has to be considered. The potential for chronic toxicity is low if there is turbulence and currents that disperse the dissolver, since concentrations are more rapidly reduced below a threshold of effect. **Main hazard:** Aquatic toxicity	Plankton Pelagic (e.g. herring, sprat) and demersal fishes[2] Marine mammals (e.g. seals, porpoises) Benthic organisms Other organisms that inhabit the water column
Sinkers (e.g. tetrachloroethylene)	Not readily soluble, being lipophilic and denser than seawater.	Solid and liquid sinkers fall to sediments and affect mostly **benthic biota**. They mix with the sediments and tend to be retained for a long time depending on the solubility and physical state. Low solubility solids tend to remain for very long time, while liquids, if not insoluble, are more prone to disperse. At seabed, liquids spread and create a physical barrier that prevents oxygen exchange, covering the habitat for a time that depends on solubility, turbulence and currents.	Benthic fish Other benthos communities Other organisms that feed on the bottom (e.g. predators of benthic organisms)

[2] Many fish species have rather restricted spawning areas in open sea, or in coastal areas. From there, eggs and larvae are transported with the currents to specific nursery areas. Often these nursery areas are productive tidal areas along the coast, such as estuaries. Spills in these areas may cause severe losses to the population, because the juvenile stages are generally much more sensitive than the adults and also occur in more concentrated numbers.

	Sinking solids may clog the sediment surface for very long periods if insoluble and for less time if they dissolve. However, if they dissolve (sinkers dissolvers), they are more bioavailable for the food chain. In the case of being **toxic**, the time they persist before dispersing and/or dissolving determines their acute or chronic toxicity. Thus, chemicals that sink have the potential to contaminate the seabed and sometimes to **persist** in the sediment. Direct danger to human beings is very limited. **Main hazards**: Persistence; Hindrance	