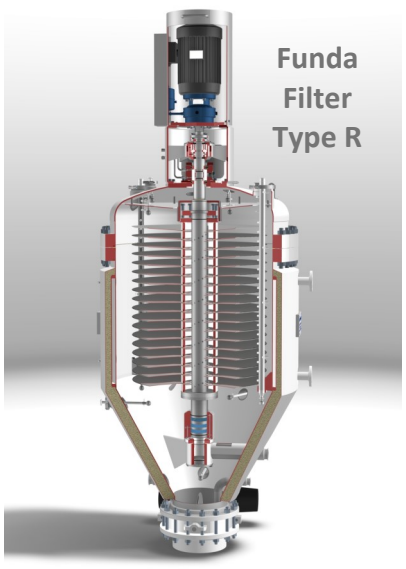
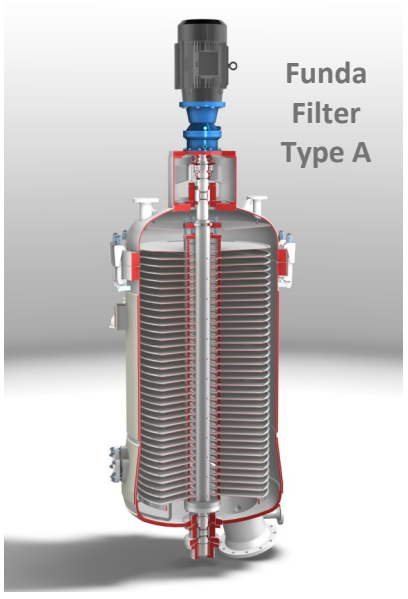
(631) 563 8300 / sales@steri.com

Filtration of Catalyst

Catalysts are substances which induce a chemical reaction without actually participating directly in the reaction. Generally, such a catalyst reappears at the end of the reaction totally unchanged. This applies especially to catalysts which are solids and of metallic nature. The most commonly used metallic catalysts are noble metals such as platinum, palladium, rhodium, ruthenium. Additional metals like nickel and copper are also used as catalysts. In some cases, such metals, when applied as catalysts, are used in fine powder form, yet more frequently they are applied chemically attached to substrates such as activated carbon or diatomaceous earth. These substrates are soaked in the solution containing the chemically dissolved metal, the pure metals are then chemically precipitated on the substrate which is subsequently described as the "carrier''. Aluminum oxide is widely used as a "carrier."





The most frequent use of such catalysts lies in reducing reactions, i.e. hydrogen is built into the molecule, a reaction widely used in organic synthesis.

Typical Reactions

			Catalyst
Oleofines	▶	Paraffin	Palladium
Ketones	▶	Alcohols	Ruthenium
Aliphatic aldehydes	▶	Alcohols	Ruthenium
Aromatic Aldehydes	▶	Alcohols	Palladium
Nitroso Aromatics	▶	Anilines	Palladium
Organic Acids	▶	Alcohols	Ruthenium
Imines	▶	Amines	Platinum
Anilins	▶	Cyclohexylamines	Ruthenium
Benzyl compounds	▶	Aromatic Hydrocarbons	Palladium
Epoxides	▶	Alcohols	Palladium

Cake Density.
Wet bulk, i.e. apparent density of catalysts on carbon carriers range from 0.2 to 0.4 Kg/Liter. Weight percentage must be multiplied by 2.5 to 5 in order to obtain the Volume percentage. Wet bulk density of catalysts on aluminum oxide powder ranges from 0.6 to 0.9 Kg/Liter. Multiply the weight percentage by 1.6 to 1.1 in order to obtain the volume percentage.

Cake Handling.
In many cases, recovered catalyst in the dry state are pyrophoric, i.e. they can ignite in the presence of air. Most applications also include dangerous chemicals which require a completely enclosed system and contained cake handling.

Sizing.
In most cases the batches contain relatively small quantities of catalyst. Typical volume percentage range from 0.1% to 3%. PSD (particle size distribution) usually range between 0.5 to 20 micron. Most applications do not use filter aid. Often the sizing is determined by the required filtration rates. Typical rates are between 800 to 1000 Liter/m2/Hr. Rarely is the volume of the catalyst the limiting factor.

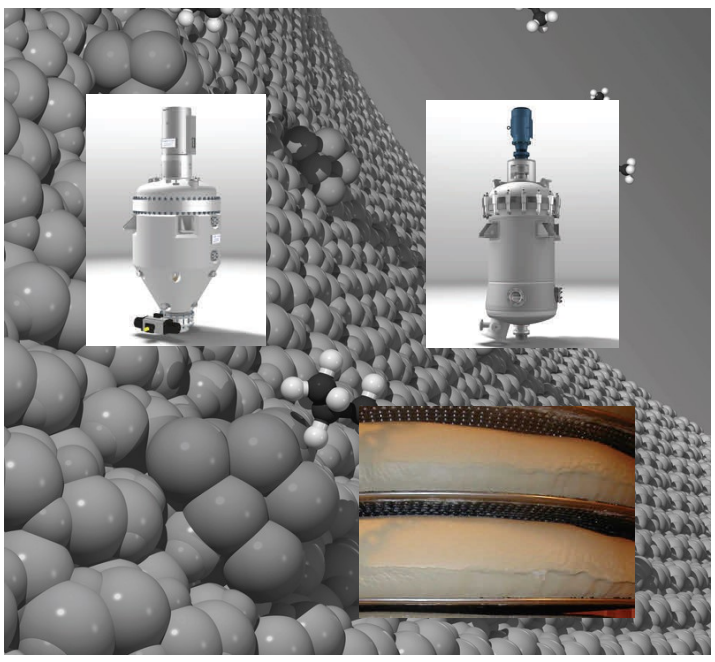
Filter Design.
There are almost an equal amount of R and A Type Funda Filters in operation for catalyst recovery. If both a slurry cake discharge and dry cake discharge is required we recommend the R/A type. An R/A type Funda filter is essentially a R type with an added spool piece for the slurry discharge. Material of construction varies as the different applications require certain material of construction for chemical compatability. Most filters are jacketed if there is a need to dry the catalyst prior to discharge. Typical filter media for catalyst are in the 10 to 20 micron range. Most popular are still the PTFE cloth but the welded multi-layer screens with the possibility to back wash are gaining popularity.

R or A Type

Dry cake or **slurry cake** discharge. Or both?

Catalysts are either used once and subsequently filtered out or they are recycled a number of times. If recycled, part of the used catalyst is mixed with new catalyst for the next reaction.

In most cases precious metals are used as catalysts in a wide range of chemical processes. They are fixed to a solid support for ease of handling.



FUNDA by STERI

857 Lincoln Avenue
Bohemia, New York 11716
U.S.A.

Toll Free: 1-800-253-7140
Phone: 631-563-8300
Fax: 631-563-8378

e-mail: sales@steri.com
web: www.steri.com