ROYTEC
Global Separation Solutions

Johannesburg | Perth | Toronto | Yantai | Santiago

ROYTEC **DUAL MEDIA™** FILTER

MARKET LEADERS IN LIQUID / SOLID SEPARATION

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ROYTEC GLOBAL is an International Company specializing in Liquid / Solid and mineral Separation technologies for the Mining and Industrial sectors.

Roytec is privately owned by Directors and Managers. We are passionate about excellence in our services and we pride ourselves in delivery to our promises. Our equipment is fully supported by Roytec Specialists based in Johannesburg, South Africa; Perth, Australia; Toronto, Canada; Yantai, China and Santiago, Chile.

Roytec have been the licensees for Spintek Filtration's solvent extraction filtration technology in Africa since 2001 and added China and Australia as new territories in 2018 and 2020 respectively.

Roytec provides over 100 man years of applications knowledge and is responsible for equipment sizing, design, engineering, supply, fabrication, inspection testing, delivery, installation and commissioning support of all solvent extraction filter packages sold in the territories.

Roytec utilises South African and Chinese supply chains complete with original Spintek Filtration internals and media to ensure optimum value to our customers through competitive pricing for market leading technology.

Roytec have successfully executed many solvent extraction filter packages to numerous customer's over the last 18 years treating large volumes of rich electrolyte and raffinate from mixer-settlers where as low as 10 and 2 mg/l of suspended solids and entrained organic respectively can be obtained in filter package outlet liquor to electro-winning.

We have included a few of our larger reference installations below:

END USER	FILTER SIZE
Skorpion Zinc	6off 5.30mØ x 4m tan to tan 6off 4.80mØ x 4m tan to tan 3off 4.60mØ x 4m tan to tan 2off 1.60mØ x 4m tan to tan
Kansanshi Phase 1	3off 4.63 mØ x 1.55m tan to tan
Kansanshi Phase 3	2off 4.63 mØ x 1.55m tan to tan
Mufulira SX1 Mufulira SX2 Mufulira SX3	4off 1.95 mØ x 1.55m tan to tan 4off 1.95 mØ x 1.55m tan to tan 4off 1.95 mØ x 1.55m tan to tan
Nkana Copper Calcine Leach Nkana Copper Oxide Leach Nkana Copper In-situ Leach	3off 2.40 mØ x 1.55m tan to tan 3off 2.40 mØ x 1.55m tan to tan 4off 1.95 mØ x 1.55m tan to tan
Sable Zinc	3off 1.9 mØ x 1.55m tan to tan
Tenke Fungurume	4off 5.0 mØ x 1.55m tan to tan
Kinsevere	3off 4.33 mØ x 1.55m tan to tan
KMT	3off 4.63 mØ x 1.55m tan to tan
MUMI 20K	3off 2.56 mØ x 1.55m tan to tan
MUMI 40K	6off 2.56 mØ x 1.55m tan to tan
MUMI 100K	4off 2.56 mØ x 1.55m tan to tan
Kansuki / MUMI 100K	12off 2.56 mØ x 1.55m tan to tan
Kamoto Phase 4	12off 5.0 mØ x 1.55m tan to tan
Kansanshi	3off 4.63 mØ x 1.55m tan to tan
Kipoi	3off 2.80 mØ x 1.55m tan to tan
Tschudi Copper	3off 2.40 mØ x 1.55m tan to tan
Etoile Chemaf Copper	3off 2.56 mØ x 1.55m tan to tan
ERG	3off 4.63 mØ x 1.55m tan to tan

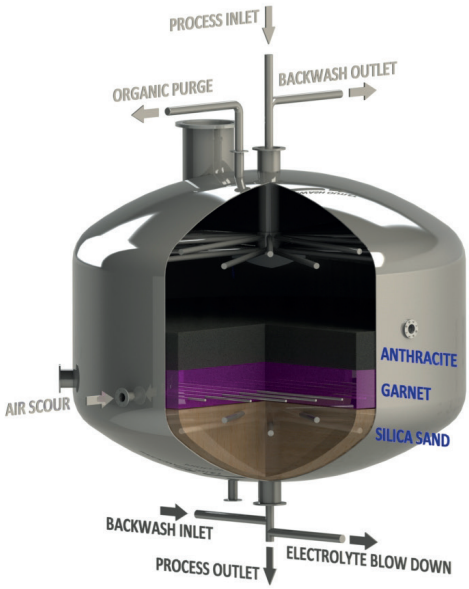
The filter packages are specifically designed to provide superior organic removal and filtered electrolyte or raffinate for the solvent extraction market. The packages are ruggedly designed and built to operate in difficult environments. All filter packages include vessels, media, piping, valves, instrumentation and controls for a completely automated stand alone system.

PRE-ASSEMBLY

The filter packages are designed and costed for skid mounting where route surveys allow for ease of installation and reduction of site costs. No field welds are required on site, all piping is fully assembled and supported to the battery limit. All valves and instrumentation are connected and terminated to junction boxes or PLC I/O, loop checked with pressure testing and full FAT for the package completed in the workshop.

PRESSURE VESSELS AND SKID

The filter package pressure vessels are designed to ASME VIII Div. 1 and constructed of 316L. Manways, for media loading and maintenance access, supports and sight glasses are also constructed of SS316L with flange specification to suit customer's requirements. The vessels are mounted on a carbon steel skid suitably painted for the harsh environment.



VESSEL INTERNALS

The vessel internals consisting of inlet and outlet hub radials or header laterals for inlet and backwash flow and air scour header laterals are precision engineered and constructed of SS 316L, matched to the specific filter duty to ensure proper flow distribution for effective media utilisation and pressure drop for optimal performance. The internals are fitted with US 50 mesh wedge wire screens on the outlet radials/laterals and air scour laterals to retain media and with US 20 mesh wedge wire screens on the inlet radials/laterals to allow fines generated due to attrition to exit the filters during backwash.

CONTROLS AND INSTRUMENTATION

Filter packages are fitted with PLC based control panels for automatic control of the rich electrolyte feed, organic purge, electrolyte blowdown, air scour and backwash. Standard instrumentation includes magnetic flow meters, pressure transmitters, level switches and temperature transmitters.

PIPING AND VALVES

Piping is manufactured from HDPE and SS316L on the organic purge, electrolyte blow down and air scour piping where elevated temperatures from hot air from the air scour blower(s) prevents the selection of HDPE. High performance butterfly valves are used on the process lines as these are superior for throttling applications to control inlet and backwash flows, have a straight through flow path, high capacity, are better suited to viscous media and can pass solids. The process valves are fitted with fail close spring return pneumatic actuators with either solenoids or positioners for on/off and control applications respectively.

FILTER MEDIA

The media is selected for the specific filter duty and to match the design of the vessel internals. Anthracite is double screened for a superior uniformity coefficient which assists with flow distribution in service down flow and uniform bed expansion in backwash up flow. Anthracite in this application is used as a coalescing media for the removal of entrained organic droplets in the rich electrolyte from SX which are physically adsorbed via van der Vaal's forces. The entrained organic droplets coat the surface of the anthracite particles which coalesce to form larger droplets which float up against the down flow to the top of the vessel and exit during the organic purge step of the backwash sequence. The surface chemistry of the anthracite is therefore important and hence the need to select the anthracite on the basis of fixed carbon content. The anthracite is "regenerated" by air scouring to remove the entrained organic that coats the particles and backwashing. Hardness is also an important parameter in selecting the anthracite to minimise attrition and losses during backwash. Garnet is used as the filtration media and selected for its particle size distribution, hardness and chemical composition i.e. resistance to acid attack. The garnet is double screened to improve the uniformity coefficient and to remove any near size material that may result in blockage of the wedge wire screens. The use of a slightly higher particle size allows for increased service life as the combination of chemical attack from the rich electrolyte and erosion from air scour results in a loss in particle size with time.

CUSTOM FEATURES

Filter packages are custom built for each and every application. Options can include alternate materials of construction for the vessels, piping and valves subject to the chemical composition of the rich electrolyte or raffinate.

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Other ROYTEC equipment

- Vacuum Belt Filters & Vacuum Disc Filters
- Thickeners using RadFlow Feedwell Technology
- BGRIMM Flotation Cells, Magnetic Separators and Attritioning Mills
- Filter Presses & Tower Presses
- Ceramic Disc Filters
- Ion Exchange Systems
- Flocculant / Coagulant Preparation Dosing Plants
- Linear Screens
- Dynamic Bed & Pinned Bed Clarifiers
- Vibrating Screens

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MARCH 2025