

# water

## RESINDION RESINS FOR WATER TREATMENTS

DTB000184

RELITE P60 - Granular Activated Carbon

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### RELITE P60

RELITE P60 is a highly active, regenerable granular activated carbon, with porous structure. It is particularly suitable for the removal of organic contaminants in drinkable water.

RELITE P60 is manufactured from carefully selected coconut carbon. The thermal activation process, carried out at strictly controlled temperatures, gives RELITE P60 a large surface area and a porous structure allowing the adsorption of low and middle molecular weight organic compounds.

RELITE P60 is an activated carbon having high density and good resistance to the attrition and the mechanical shocks which could occur during backwashing and thermal regeneration.

Its high resistance to abrasion, high density, short wetting time, the sub-microscopic structure of its pores and their average size, of about 18 Å, make RELITE P60 particularly effective in several applications:

- removal of primary and secondary organics, such as haloforms, epoxides, aldehydes and ketones deriving from the chlorination and ozonization treatments of waters for civil and industrial use;
- adsorption of biodegradable and non-biodegradable organic pollutants such as pesticides, phenols, dyes, detergents, polyoils and others usually expressed as COD, always present in waste waters.

### TYPICAL CHARACTERISTICS

Physical form	:	Black, rugged granules shipped in dry form
Moisture content as shipped	:	5 % max
Ashes	:	10 ± 2 %
pH	:	8 ÷ 10
Total surface area (N <sub>2</sub> , B.E.T. method)	:	1050 ÷ 1150 m <sup>2</sup> /dry g
Iodine number	:	950 min mg/g
CTC index	:	60 %
Apparent density	:	450 ± 20 g/l
Density, backwashed and drained column	:	420 ± 20 g/l
Particle size range	:	0.6 - 1.7 m m
Standard packaging	:	52 liter bags

### RECOMMENDED OPERATING CONDITIONS

Minimum bed depth	:		
- for dechlorination	:	750	m m
- for organics adsorption	:	1500	m m
Specific operating flowrate	:		
- for dechlorination	:	8 ÷ 32	BV/h
- for organics adsorption	:	2 ÷ 6	BV/h
Backwash expansion	:	40 ÷ 50	%

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Since the life of the activated carbon RELITE P60 can be considerably long, several years in some cases, it is necessary to periodically backwash the filters to eliminate the particles retained by the bed, the gas pockets, the channels and to hydraulically re-grade the bed.

The backwash flowrate must allow a bed expansion of 40 - 50 % for approximately 15 minutes or till the effluent is perfectly clear.

Fig. 1 shows the relation between the bed expansion of RELITE P60, backwash flowrate and the water temperature.

Fig. 2 shows the pressure drop of RELITE P60; the data refer to waters free from suspended solids, and new activated carbon.

## **REMOVAL OF ORGANICS AFTER CHLORINATION AND OZONIZATION**

The growing need of potable water and the progressive deterioration of water resources have compelled water system suppliers and food industry to more and more use activated carbons in the potable water processes in order to obtain a water quality meeting the existing regulations.

Though the disinfection processes are run following highly qualified know-hows and strong oxidants are used, such as chlorine and ozone, the obtained water may not be potable yet due to the even low presence of organics as haloforms and epoxides.

The activated carbon RELITE P60, thanks to its high activation degree and to its marked adsorption characteristics, has the power to remove such components at really advantageous costs.

The adsorption capacity of RELITE P60 is a function of the molecular weight of the adsorbed matters and increases with it till values equal to 20% of its weight for components such as hexachlorobutadiene and hexachlorocyclohexanone.

Particularly high adsorption performances and high-quality water may be obtained operating with two or more filters in series of RELITE P60. In such a system the last filter acts as polisher, allowing to fully exploit the adsorption capacity of the filters ahead. Contact time of 10 minutes and bed depths higher than 1500 mm are always recommended to obtain a high quality water.

For instance, an adsorption capacity equal to 0.5 - 0.6 % of its weight can be supposed for organic compounds listed herebelow, at that concentrations:

TRICHLOROETHYLENE	68.0	ppb
TETRACHLOROETHYLENE	6.5	ppb
I,I,I, TRICHLOROETHANE	1.9	ppb
TETRACHLOROMETHANE	5.45	ppb
CHLOROFORM	9.3	ppb
PHENOL	0.51	ppb
HYDROCARBONS	9.0	ppb

With the increase of the organic matter concentration, the adsorption capacity of RELITE P60 increases.

## **ORGANIC POLLUTANTS**

Activated carbon RELITE P60 is successfully used also for the removal of organic matters such as weed killers and pesticides. Such components, cause of their aromatics non polar characteristics and molecular dimensions, can be retained by activated carbons which have porous structures compatible with their molecular volume.

The minimum contact time, for an effective adsorption, varies according to substances dissolved in the water: 10 minutes are enough to remove bentazone molecule while atrazine molecule needs 20 minutes of contact time to be removed. In these cases the bed depth must be of 2000 mm minimum.

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On the suppositions mentioned above, RELITE P60 can show an adsorption capacity variable between 0.2 - 1 % of its weight when the concentration of pollutants varies between 0.1 and 10 ppb.

### REGENERATION

The granular activated carbon RELITE P60 is in general thermally regenerated. This kind of regeneration is more properly called thermal reactivation, for which rotary kilns or Herreshoff furnaces are used.

The activated carbon is in this case subjected to high temperatures in carefully controlled atmosphere. The result is the cracking and volatilization of the adsorbed organic compounds without damaging the structure of RELITE P60, which regains its original porosity. The physical loss of thermally reactivated RELITE P60 is about 5 %.

Fig. 1 BED EXPANSION IN WATER

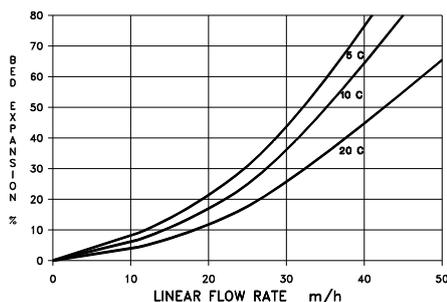
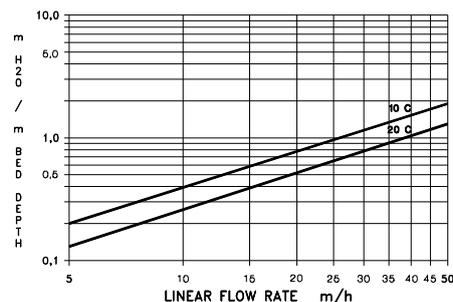


Fig. 2 PRESSURE DROP IN WATER



### WARNING

The wet activated carbon adsorbs oxygen from the air. The adsorption rate is connected with the degree of exposure of the wet carbon to the air, therefore the process is relatively quick in drained beds.

The oxygen depletion inside closed or partially closed activated carbon vessels may reach dangerous levels in short times. Consequently it is necessary, when workers enter a carbon vessel, to follow all security procedures for potentially low oxygen atmosphere.