



For more information: Sweden +46 480 41 75 50. Finland +358 9 643 602.
Germany +49 69 7191070. United Kingdom +44 151 6498344. United States +1 215 546-3900.
www.jacobi.net



Jacobi
CARBONS

Activated Carbon for Liquid Phase Decolorisation





Jacobi Carbons manufactures the ColorSorb® range of activated carbons from coal and wood raw materials by steam and chemical activation, using the latest production techniques in modern purpose built facilities. ColorSorb® activated carbons are

supplied as irregular shaped granules and fine ground powders, which are specifically designed for use in liquid phase decolorisation systems. These materials are proven adsorbents which are used extensively in the decolorisation of sugar, glucose, wine, acids and a variety of products, in plants all over the world.

- Coal and wood based activated carbons designed to meet individual decolorisation requirements
- Large pore volume for maximum decolorisation efficiency and color removal capacity
- Range of products contains both steam and chemically activated carbons for maximum flexibility
- Products are supplied in compliance with the US Food and Chemicals Codex
- Powdered materials are milled to controlled particle size specifications to ensure high rates of filtration
- Materials available in a wide range of pH specifications to match pH of liquid being decolorised



PROPERTIES OF COLORSORB® POWDERED ACTIVATED CARBONS FOR DECOLORISATION

Grade	Type	Form	Method	Molasses number	pH	Ash %	Comment
F9	Wood	Powder	Steam	300	9–11	7	General purpose decolorisation
G5	Wood	Powder	Steam	260	3–5	7	Glucose, dextrose, lactose and HFS purification
G7	Wood	Powder	Steam	280	5–7	7	Sugar purification
G9	Wood	Powder	Steam	245	9–11	7	Polyalcohols, MSG, general decolorisation
TSC [†]	Wood	Powder	Steam	435	4–7	1	Decolorisation of chemicals, pharmaceuticals, acids
P3	Wood	Powder	H ₃ PO ₄	210	3–5	3	Decolorisation of HVP, acids, fruit juice and wine
Z3	Wood	Powder	ZnCl ₂	210	3–5	3	Decolorisation of HVP, chemicals, acids, fruit juice

PROPERTIES OF COLORSORB® GRANULAR ACTIVATED CARBONS FOR DECOLORISATION

Grade	Type	Form	Method	Iodine no. mg g ⁻¹	Density g l ⁻¹	pH	Comment
2000	Coal	Granular	Steam	1050	470	7–9	General purpose decolorisation
3000	Coal	Granular	Steam	1150	440	7–9	High capacity decolorisation
5000	Coal	Granular	Steam	1200	360	7–9	Removal of high molecular weight colors
H150 [†]	Coal	Granular	Steam	1000	490	5–8	Primary corn syrup product, high purity
H200 [†]	Coal	Granular	Steam	1050	470	5–8	General purpose decolorisation, high purity
H300 [†]	Coal	Granular	Steam	1150	440	5–8	High capacity, high purity decolorisation
MAK [†]	Coal	Granular	Steam	975	470	5–8	Superior HMF removal, high purity

[†] Indicates acid washed product. All powdered products are typically supplied to a particle size specification of 65–85% < 325 mesh (0.075 mm), however, special particle sizes can be made available to suit a particular application. All granular products are available in a variety of mesh sizes including, but not limited to 12x40, 12x30, 12x20 and 8x30. Please consult individual product datasheets for full details.

Black-green phosphoric acid is used in the manufacture of fertilisers, purified phosphoric acid is manufactured using ColorSorb® activated carbon.



The Decolorisation of Industrial Acids

Phosphate rock is mined for the manufacture of phosphoric acid (H_3PO_4), which is an important industrial chemical.

Thermal processing techniques are used to directly produce high purity phosphoric acid at a high concentration. Chemical processing techniques are used as a less expensive alternative to produce black phosphoric acid, which is used in the manufacture of fertilisers. This material contains a high proportion of inorganic impurities and high molecular weight organic contamination.

Chemical precipitation techniques are used to yield a higher quality green acid, which is passed through columns of ColorSorb® granular activated carbon to produce purified white phosphoric acid.

The main application using purified phosphoric acid is the production of sodium phosphates, specifically sodiumtripolyphosphate (STPP) used in the manufacture of detergents.

PARAMETER	TYPICAL VALUE
Operation	Continuous (GAC)
Linear velocity	0.1–0.2 m min ⁻¹
Bed depth	2–4 m
Contact time	120–300 min
Temperature	20–50°C
Pressure	< 20 bar
Regeneration	
• initial rinse	H ₂ O @ 80°C / 1 h
• regeneration	NaOH @ 80°C / 2 h
• final rinse	H ₂ O @ 70°C / 1 h
Comment	Data based on ColorSorb® H200

For easy conversion to imperial units, please visit www.jacobi.net and use FastConvert™.

ACID	TYPICAL USE
Acetic (C ₂ H ₄ O ₂)	Food processing plants, cleaning/ washing agents and disinfectants
Citric (C ₆ H ₈ O ₇)	Flavoring extracts, confections, soft drinks and effervescent salts
Lactic (C ₃ H ₅ O ₃)	General purpose food additive, chemical salts and plasticizers
Phtalic (C ₈ H ₆ O ₄)	Dyes, medicines, phenolphthalein and synthetic perfume
Tannic (C ₇₈ H ₅₂ O ₄₆)	Alcohol denaturant, tanning, textile and wine clarification

STANDARD DESIGN CONDITIONS

Green phosphoric acid is decolorised in packed bed columns, which are generally operated in downflow mode. As the liquid flows through the column, the high molecular weight organic contamination is adsorbed onto ColorSorb® granular activated carbon to produce purified white phosphoric acid.

Standard plant designs are based on the operation of two columns in series. After exhaustion of the first adsorber, the flow is switched to the second adsorber whilst regeneration is undertaken.

The ColorSorb® granular activated carbon is initially rinsed with hot water followed by upflow regeneration using hot sodium hydroxide until the effluent solution becomes clear. The adsorber is then rinsed again with hot water before being brought back on-stream.

STORAGE AND PACKING

ColorSorb® granular activated carbon is supplied in bags of 18 to 25 kg net weight depending on the grade, as well as in 350 to 500 kg FIBCs (big bags). Delivery in bulk (50 m³) is also possible to minimise dust and to optimise handling efficiency.

ColorSorb® activated carbons are used to slightly modify the color of red, rosé and white wines or for complete decolorisation



The Decolorisation of Wine

Wine making is an ancient art which relies upon natural raw materials and the skill of the wine maker to consistently produce a high quality product. Due to the variability of the grapes and the presence of complex organic compounds, it can be difficult to achieve a consistent color.

Amongst the complex organic compounds are antho-cyanidins which give a red coloration and chlorophyll which will give a yellow coloration. Other compounds such as carotenoids and tannins may also be present.

ColorSorb® powdered activated carbon has been relied upon for many years for the complete decolorisation or slight color modification of red, rosé and white wine. The standard process conditions are determined using simple laboratory scale techniques, which are readily transferred to full scale processing operations with a high degree of accuracy.

PARAMETER	TYPICAL VALUE
Operation	Batch (PAC)
PAC dosage	50–150 g l ⁻¹
Contact time	30–120 min
Temperature	Ambient
Mixing technique	
• type	Propeller stirrers
• pre-slurry strength	<15% (by weight)
• mixing speed	60 rpm
Filtration technique	
• type	Plate and frame
• pre-coat	Bentonite
• quantity	400–600 g m ⁻²
Comment	Data based on using ColorSorb® P3

For easy conversion to imperial units, please visit www.jacobi.net and use FastConvert™.

STANDARD PROCESS CONDITIONS

The decolorisation of wine is undertaken using ColorSorb® powdered activated carbon which is applied using batch treatment techniques. A pre-slurry is prepared at 10–15% (by weight) using water or purified wine and added to the wine which requires decolorisation at the pre-determined dosage level.

The ColorSorb® powdered activated carbon is continuously mixed with the wine using mechanical stirrers for the pre-determined time. Filter aids are added on completion of the decolorisation step and the wine is recirculated through a plate and frame filter press (or similar) to remove the ColorSorb® powdered activated carbon. The particles of the powdered activated carbon are readily removed from the wine.

Powdered activated carbon for the deodorisation of wine is applied in the same way as described above, alternative products are recommended for this application.

STORAGE AND PACKING

ColorSorb® powdered activated carbon is supplied in standard 20 kg multi-ply paper bags or in specially developed dispersable paper bags of 5 and 10 kg that disintegrate during agitation in a liquid.

TYPICAL APPLICATIONS

Wine – red, rosé and white

Alcoholic beverages – beer, gin, rum, vodka

Non-alcoholic beverages – fruit juices, decaffeination of coffee

ColorSorb® activated carbons are used for the decolorisation of starch based sweeteners such as glucose syrups, liquid dextrose and corn syrups.



The Purification of Starch Based Sweeteners

Starch based sweeteners such as glucose syrups, liquid dextrose and corn syrup are produced using hydrolysis and isomer conversion techniques.

During the process of hydrolysis of starch to glucose, color compounds are formed from the original starch and from the thermal decomposition of D-glucose. In addition, hydroxymethylfurfural (HMF) is also formed which must be removed to obtain color stability in the end product and to protect the immobilised enzyme system used to convert D-glucose to high fructose syrup (HFS). To assist with processing it is also necessary to remove foaming agents.

Following the isomerisation of D-glucose to HFS, additional treatment with ColorSorb® powdered activated carbon is applied to remove residual color compounds and to adsorb the off-taste resulting from the use of ion exchange resins.

STANDARD DESIGN CONDITIONS

PARAMETER	TYPICAL VALUE
Operation	Batch (PAC)
PAC dosage	5–20 g l ⁻¹
Contact time	30–60 min
Temperature	70–80°C
Mixing technique	
<ul style="list-style-type: none"> • medium • pre-slurry strength • mixing speed 	water or dilute liquor < 15% 60 rpm
Process stages	
<ul style="list-style-type: none"> • Step 1 • Step 2 	Hydrolysis of starch to glucose Isomerisation of glucose to HFS
Batch treatment	
<ul style="list-style-type: none"> • Step 1 • Step 2 	ColorSorb® P3 ColorSorb® G5
Comment	Data based on glucose decolorisation, special conditions apply to HFS purification

For easy conversion to imperial units, please visit www.jacobi.net and use FastConvert™.

In the decolorisation of glucose, ColorSorb® powdered activated carbon is generally used to treat the filtered neutralised converter juice. ColorSorb® powdered activated carbon is prepared as a slurry and added to the mixing tank, continuous stirring is applied for the required contact time at a temperature of 70–80°C.

In order to optimise the efficiency of the system, a two stage counter-current process is often used. Neutralised converter juice is filtered and treated with the ColorSorb® powdered activated carbon, which is subsequently removed in the filter presses.

The once used material is returned to the circuit upstream of the virgin ColorSorb® powdered activated carbon, filtration may be made separately or on the same filter presses. Additional processing techniques are used to produce HFS, requiring subsequent treatment with a specialist ColorSorb® powdered activated carbon.

ColorSorb® granular activated carbons are also used in continuous flow systems for the purification of glucose syrups, liquid dextrose and corn syrup in packed bed adsorbers.

STORAGE AND PACKING

ColorSorb® activated carbons are supplied in 20–25 kg bags, 400–500 kg FIBCs (big bags) or in bulk (50 m³). All packaging is of the highest standard.



Jacobi CARBONS

Jacobi Carbons AB – Sweden

Varvsholmen, SE-392 30 Kalmar.
Tel: +46 480 41 75 50. Fax: +46 480 41 75 59.
Email: info@jacobi.net. Web: www.jacobi.net

Jacobi Carbons GmbH – Germany

Feldbergstraße 21, D-60323 Frankfurt.
Tel: +49 69 7191070. Fax: +49 69 71910720.
E-mail: infode@jacobi.net. Web: www.jacobi.net

Jacobi Carbons (Suomen Siv.) – Finland

Ratakatu 1BA3, SF-00120 Helsinki.
Tel: +358 9 643 602. Fax: +358 9 642 900.
Email: infofin@jacobi.net. Web: www.jacobi.net

Jacobi Carbons, Inc. – United States

1518 Walnut Street, Suite 1100. Philadelphia,
PA 19102. Tel: +1 215 546-3900. Fax: +1 215 546-9921.
E-mail: infous@jacobi.net. Web: www.jacobi.net

Jacobi Carbons Ltd – United Kingdom

Niord House, Lord Street, Birkenhead,
Merseyside CH41 1HT.
Tel: +44 151 649 8344. Fax: +44 151 649 8345.
E-mail: infouk@jacobi.net. Web: www.jacobi.net

Sales and Marketing



Jacobi Carbons AB – Sweden

Headquarters of the Jacobi Carbons Group,
coordinating worldwide sales and marketing



Jacobi Carbons (Suomen Siv.) – Finland

Sales and marketing of activated carbon in
Finland and the Baltic States.



Jacobi Carbons GmbH – Germany

Sales and marketing of activated carbon in
Germany and Continental Europe.



Jacobi Carbons Ltd – United Kingdom

Sales and marketing of activated carbon in
the United Kingdom and Republic of Ireland



Jacobi Carbons, Inc. – United States

Sales and marketing of activated carbon in
the United States and Canada.



Jacobi Carbons Agents – Worldwide

A diverse network of agents and distributors
strategically located around the world.

Production and Engineering



Jacobi Carbons Co. Ltd. – China

The manufacture of extruded and granular coal
based activated carbons – ANSI/NSF 61 facility.



Jacobi Carbons (Pvt.) Ltd. – India

The manufacture of granular coconut shell
based activated carbon.



Jacobi Carbons AB – Sweden

Powdered activated carbon manufactured from
coal, coconut shell and wood.



Jacobi Carbons Ltd – United Kingdom

Specialist impregnation facility, technical
activated carbons, media handling and
adsorption equipment.



Jacobi Carbons operate
in full accordance with
approved ISO-9000 quality
control procedures