AN ISO 22000-2005 CERTIFIED COMPANY
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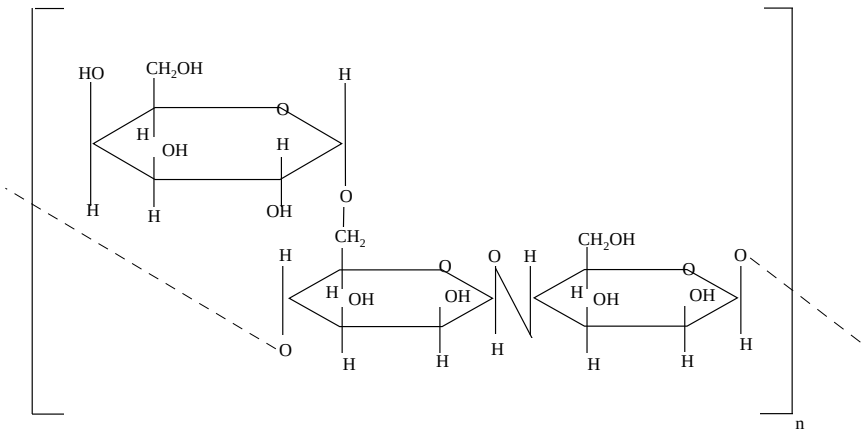
Rama Industries
Manufacturer & Exporter of Guar Gum Split & Powder
Government Recognised Export House Status

P R O D U C T P R O F I L E

Industrial Grade Guar Gum

INDUSTRY-WISE APPLICATIONS

CHARECTERISTICS OF GUAR GUM



The most important property of Ricol Guar Gum is its ability to hydrate rapidly in cold water, to attain a very high viscosity at relatively low concentrations. Its specific colloidal nature gives the solution an excellent thickening power which is 6 to 10 times higher than that obtained from starch. It is stable over a wide range of pH. It also improves flowability and pumpability of fluid. It is a superior friction loss reducing agent.

Ricol Guar Gum, either modified or unmodified, is a very versatile and efficient bio-polymer covering a wide range of industrial applications such as:

- Oil drilling
- Textile printing
- Human Food and Pet Food
- Paper
- Explosive
- Water Treatment

- Ore flotation

where its binding, thickening, film forming and lubricating factors are of great interest.

In paper industry, Guar Gum ensures a more regular distribution of pulp fibre throughout the sheet resulting in increased burst strength and tensile strength. High recovery of purified ore is achieved when it is used as depressant for slimes.

For food applications, Guar Gum is an effective water retention agent because it is intensely hydrophilic. It is widely used to thicken and stabilise salad dressings, ice-cream, lollipops, bakery products, confectioneries, meat, sausages and cheese spread. It is also used as a stabiliser in frozen food.

In textile industry, it is used as a thickening and sizing agent. It is used as thickening agent in various pharmaceutical preparations. Guar Gum is also used in various cosmetics in the manufacture of both toothpaste and shaving creams. It imparts slip for extruding the paste from the tube without applying excessive pressure. It mixes well with most detergent systems and hence is used in the manufacture of shampoos and cleansers.

Besides the above uses, Guar Gum is also used in ceramics, tobacco industry and in the manufacture of water-proofing agent in explosive.

The main applications of the above derivatives are as follows:

1. Hydroxy-alkylated guar gum are the derivatives which have attracted the maximum applications of guar gum. In the paper industry, formation of derivatives results in a decrease in the extent of hydrogen bonds formed with cellulose, which is useful for production of certain special grades of paper. In the mineral industry, they are used as filtration aids in the treatment of uranium minerals. In the explosive industry, solubility in glycols and alcohol make these derivatives interesting as thickness for production of certain types of explosives.

   Hydroxypropyl guar may be deploymerized at controlled rates, using a compound such as ammonium persulfate. This technique is used in oil stimulation where viscosity of guar is used for fracturing and must be reduced afterwards through depolymerisation of the gum in order to enable pumping out of the oil.
2. The carboxymethyl guar gives better results than guar gum in textiles and carpet printing.
3. Modified guar gum is also used in textile industry.
4. The oxidised guar gum is insoluble in water. It can be used as a wet-end paper additive.
5. Acetates of guar gum can be used to make films.
6. Cationic guar, being a highly active flocculant, can be used in mineral dressing and waste water treatment. It hydrates more

quickly and is less acid or alkali sensitive than unmodified guar. It acts as a better flocculant for iron, copper and zinc ores. It imparts dry strength to paper. It is also useful for fibre retention and as a de-watering aid in sheet formation.

7. Sulphated guar gum can be used as a substitute of heparin to prevent coagulation of blood.
8. Guar gum formate is superior to modified guar gum as a sizing agent in the paper industry.
9. Guar gum acrylamide, a reaction product of guar gum with acrylamide, provides stability in an alkaline medium for textile printing.
10. Borate cross-linked guar gum is used in oil field drilling operations where it has been found to be more effective for the control of lost circulation.
11. Reticulated guar gum is used as gelling agent in manufacture of liquid and solid explosives.
12. Carboxymethylhydroxy propyl guar gum is also used in fracturing applications in oil industry. Its application has been commercialised on a modest scale at present.
13. Depolymerised guar gum is used as a dietary fibre in food industry.

Out of the above derivatives, the first three viz. hydroxypropyl guar gum, carboxymethyl guar gum, and modified guar gum constitute bulk of the total derivatives manufactured at present.

INDUSTRY-WISE APPLICATIONS

Broadly the applications of guar gum are as follows:

a) **Technical**

- ❖ Oil Well Drilling
- ❖ Paper
- ❖ Mining
- ❖ Water Treatment
- ❖ Textile Printing
- ❖ Explosives
- ❖ Tobacco
- ❖ Fire Fighting

b) **Food - Human and Animal**

- ❖ Frozen Foods
- ❖ Bakery
- ❖ Dairy Products
- ❖ Canned Foods
- ❖ Dressings
- ❖ Instant Mixes
- ❖ Beverages
- ❖ Pet Foods

c) **Pharmaceuticals and Cosmetics**

- ❖ Laxative
- ❖ Slimming Aids
- ❖Diebatic Treatment
- ❖ Tablet Preparation
- ❖ Ointment

d) **Cosmetics and Miscellaneous**

- ❖ Hair setting
- ❖ Soaping and Shampoos
- ❖Lipsticsks
- ❖ Mosquito coils

INDUSTRY-WISE APPLICATIONS OF GUAR GUM

Sr. No.	Industry	Uses	Derivatives	Functions
1	Oil Well Drilling	Drilling fluids hydraulic fracturing	Borate cross-linked guar gum, hydroxy alkyl ether derivatives	Control of water loss, viscosity, suspension, turbulence, mobility, friction reduction.
2	Textile Printing	Cotton, rayon silk, wool sizing, carpet printing	Carboxy-methyl guar, hydroxy propyl guar, modified guar gum	Reduces warp breakage, reduces dusting film forming thickening for dye.
3	Paper	Wrapping paper, kraft, photographic paper, filter	Oxidised guar gum, cross-linked, guar gum amino ethyl gum, modified guar gum, guar gum formate	Replaces hemi-cellulose, increase strength, fold, pick, pulp hydration, etention of fines, decreases porosity.
4	Mining	Concentration of	Aminoethyl guar gum,	Flocculating and settling

Sr. No.	Industry	Uses	Derivatives	Functions
		ore, filtration	sulphate of guar gum	agent, filter aid.
5	Explosives	Stick explosives, blasting slurries	Reticulated guar gum, cyanoethyl ether of guar gum	Water proofing, gelling agent.
6	Water Treatment	Industrial water, drinking water	Food grade guar gum	Coagulant aid (food approved).
7	Tobacco	Reconstitution of fragmented tobacco	Reaction product of carboxy-methyl cellulose and guar gum	Binding agent, strengthening agent.
8	Coal Mining	Coal suspension, shock impregnation	Borate cross-linked guar gum	Friction reducing suspending agent
9	Fire Fighting	Water for fighting fires	Guar gum with ethylene glycol and glycerol	Friction reducing, dispersion and direction control.
10	Ceramic	Enamels, electro-ceramics	Chlorinated guar gum	Fixing, binding thickening agent.
11	Photography	Emulsions, gelatine solutions	Borate cross-linked guar gum hydrolysed guar gum	Gelling, hardening agent.
12	Synthetic Resins	Polymerisation, suspension, collagen dispersion	Suspension of guar gum with CMC	Thickening, binding agent.
13	Frozen Foods	Ice creams, soft serves, frozen cakes	Food grade guar gum with CMC	Water retention, ice crystal inhibitor, stabilizer.
14	Bakery	Bread, cakes, pastry icing	Non-metabolished guar gum	Dough improvement, greater moisture retention, prolonged shelf life.
15	Processed Cheese	Cottage cheese, cream cheese	In combination with other water soluble gums	Increases the yield of curd solids, improves tenderness.
16	Dairy Products	Yoghurts, desserts, moussess	In combination with other water soluble gums	Inhibits when separate keeps texture after sterilisation.
17	Dressings and Sauces	Salad cream, pickles, barbecue relish	In combination with other water soluble gums	Cold water dispersible, acid resistant emulsion stabiliser.
18	Instant Mixes	Pudding, sauces, desserts, beverages	In combination with other water soluble gums	Fast, cold, dispersible thickening and texturising agent.
19	Canned Foods	Pet foods, corned meat, baby foods	In combination with other water soluble gums	Reduces splash while filling viscosity control prevention of fat migration.
20	Beverages	Cocoa drink, fruit nectar, sugarless beverages	In combination with other water soluble gums	Acid resistant thickening and suspending agent.
21	Animal Feed	Veterinary preparations, calf milk replacer	In combination with other water soluble gums	Suspending agent, granulating agent.
22	Pharmaceuti-cals	• Laxatives, slimming aids	Food grade guar gum	Bulking agent bulk forming appetite

Sr. No.	Industry	Uses	Derivatives	Functions
				depressant.
		• Gastric hyper acidity	Food grade guar gum	Synergistic activity with bismuth salt.
		• Diabetic treatment	Food grade guar gum	Reduction of urinary glucose loss.
		• Cholesterol	Food grade guar gum	Reducing aid.
		• Vitamin formation preparation	Food grade guar gum	Stable water soluble suspension.
23	Cosmetics	Ointments	Food grade guar gum	Thickening agent, gives unctuousness.
		Lotions	Food grade guar gum	Lubricating, suspending agent.
		Tablets	Food grade guar gum	Disintegrating and granulating agent.
		Hair Shampoos	Food grade guar gum	Detergent compatible thickener.
		Hair Conditioners	Food grade guar gum	Protective colloid film forming agent.