NEW DIRECTIONS AUSTRALIA

# Thickeners Master Data Sheet

| Thickener | Xanthan Gum | Acacia and Xanthan Gum | Acacia Gum | Hydroxyethyl cellulose | Carbomer | Carrageenan | Guar Gum | Aluminium Magnesium Silicate | Guar Hydroxypropyl Trimonium Chloride | PVP (Polyvinyl Pyrolidone) |
|---|---|---|---|---|---|---|---|---|---|---|
| **Origin** | Biotechnology – Microbes | Plant based + Biotechnology | Plant based | Plant based plus ethoxylation (petroleum) | Synthetic (Acrylic Acid) | Plant Based (seaweed) | Plant Based From the seed of the guar plant. Cyamaposis Tetragtonolobus. It is a galactomannan gum. | Mineral (purified smectite clay mined from the ground) | Modified guar gum. Semi-Synthetic | Synthetic polymer |
| **Clarity of gel** | Hazy | Hazy | Relatively Clear but orange tinge | Crystal Clear | Crystal Clear | Clear | Slightly hazy | Creamy | Clear | Crystal Clear |
| **Key benefits** | all natural, sustainable, low-odour, high tolerance for acids and bases so very flexible. | all natural, sustainably sourced, improved flow over xanthan gum and super-fast hydrating. | Emulsifying power and ability to solubilise small amounts of essential oils in some cases. All natural and good acidic stability. Acacia gum is also reported to have some anti-oxidant properties which make it an active part of your skin care product rather than just a thickener. | Great clarity and compatibility with surfactants for high quality shampoo and body wash formulations. It also boosts foam stability and skin feel. | Crystal clear high viscosity gels suitable for hair and skin care. None of the stickiness that can come with natural gums so products typically feel luxurious and smooth on the skin. | Feels amazing on the skin when used at low levels, great slip and lubricity. Also the cationic nature of the thickener gives it great long-term substantivity which makes it a good addition to sunscreen and make-up formulations. | This ingredients low reactivity make it great for hard-to-stabilise formulations. It is fairly un-reactive with acids, alkali, cationics and anionics meaning it can be used to thicken and stabilise a whole range of products. It also hydrates quickly and while not crystal clear is more than acceptable for a natural formulation. | This works in a very different way to the gel based thickeners. It has traditionally be used in cosmetics to stabilise foundations, clay based formulations and formulations using salicylic acid and anti-dandruff additives. The skin feel is soft and slightly powdery which makes it great for emulsion formulations that need to feel light and non-greasy. | This ingredient has been designed to be substantive to the hair and skin so while the carageenan gives some natural substantivity this goes the extra mile in terms of conditioning and long-term skin moisturisation. When used in a haircare product it can enhance the foam quality and can help to moisturise the scalp. | This polymer is used for its film forming properties. It can be thought of as a mild 'glue' that can either stick products such as suncreen or foundation to the skin or style the hair. PVP is frequently used in hair styling products where it stiffens the hair by coating it with a fine film of polymer that can easily be washed off. |
| **Viscosity at 1.5% in water** | Medium | Medium | Low (builds up viscosity when used at high concentrations. Can be used up to 50% | Medium (there are different grades of HEC but the one that New Directions currently stocks gives a medium viscosity at 1.5% | Very High | Medium | High | Medium | Medium | High |
| **Flow** | Gel-like | Gel-like | Watery at 1.5% | Smooth | Scoopable | Smooth | smooth | Smooth | Smooth | Gel like to smooth |
| **Odour** | Nil | Nil | Nil | Nil | Slightly Chemical | Slightly Seaweed with some grades | Slight odour but not offensive. Natural. | Clay-like to none | Characteristic – slightly chemical | Characteristic-slightly chemical |
| **Ease of hydration** | Can form fish-eyes (un-dissolved bits of gum) that may be tricky to disperse. Best in hot water with good mixer. | Easy to use and hydrate, even with a spoon or hand mixer. | Easy but forms very low viscosity | Easy but takes a long time and is best with an over-head mixer. Would be a challenge without that. | Can form fish eyes, takes a while to fully hydrate and requires the use of an over-head mixer for best results. | Can form fish-eyes unless mixed well. Best with an overhead mixer but a hand mixer will do the job in a small batch. | Easy. Can be hydrated with a hand mixer. | Requires a reasonable amount of stirring time so best with an over-head mixer. Also best when no other materials are present in the water phase at time of hydration. | Easy, can be mixed in with no special equipment but an over-head mixer does make it easier. | Ideally requires an over-head mixer as this can form fish-eyes if not hydrated properly. |
| **Emlulsification Benefits?** | Yes can hold a small oil phase if the right procedure is used. | Yes | Yes | No | Not really an emulsifier but can hold oils due to its viscous structure | No | No | Yes, can stabilise emulsions. | No | No |
| **Heat Tolerance** | Excellent | Excellent | Excellent | Excellent | Excellent | Excellent | Can tolerate high heat but not repeated heating over 50C. | Yes | Yes | Yes |
| **pH tolerance** | Excellent. Can tolerate acidic conditions well so useful with AHA formulations Maximum performance between pH 4-10 but can tolerate pH 3. | Thickens up to a glue with low pH. OK at neutral or slightly alkaline | Pretty good in acidic conditions. Best around pH 4-6 | Thickening possible between pH 2-12 but most efficient between 6.5-8. In very low pH solutions the viscosity of the gel can drop due to neutralisation of the polymer chains. In high pH the electrolyte reduces electrostatic attraction between the chains and thins the solution. | Poor in acidic conditions. Requires pH 5-8 ideally as in low pH the polymer chains are in their un-neutralised, low viscosity state. | Excellent | Excellent. Best from pH 4-10 but can tolerate lower pH. | Yes, good for AHA's and caustic solutions for cleaning. Can also be used with peroxides which make it useful in bleaches and hair dye solutions. | Good | Best at pH 4-8 |
| **Chemistry** | Anionic | Slighty Anionic | Complex intra-molecular bonding some of which is ionic (mostly anionic) while the majority is non-ionic (hydrogen bonding) between sugar chains. | Non-Ionic | Non-Ionic, Thicken by neutralisation. | Cationic | Non-Ionic | Non-Ionic | Cationic | Non-Ionic |
| **Electrolyte Tolerance (salts such as Aloe)** | Good with sodium chloride and can tolerate anionic, amphoteric and non-ionic surfactants. Not compatible with cationics. Surfactant active levels in excess of 15% may cause precipitation of the gum. | Good | Good | Excellent - Can be used in solutions of up to 50% Salt. Can be used in surfactant solutions such as liquid soaps, conditioning spritzers etc. Doesn't tolerate anionic surfactants as well as other types. | Poor | Good | Good | Good once hydrated. | Good | OK |
| **Suspending Power** | Poor | Good (1500 CPS) | Poor | Poor | Excellent (Over 3000 CPS) | Poor | Good (1500 CPS) | Good (2000CPS plus) | No | Poor |

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