# Ingram Tribology

White Paper: How friction testing helps inform the mouthfeel of Craft Beer

The size of the craft beer market in the UK is a huge £1.4bn. With breweries big and small experimenting and producing a huge variety of different beers.

One performance attribute of the beer is its 'mouthfeel' – the perception the drinker experiences whilst enjoying the beer.

The mouthfeel of the beer can be controlled with the beer carbonation and its viscosity. The viscosity of the beer in turn can be controlled with the concentration of sugars and larger molecular weight solutes such as beta-glucan and dextrin.
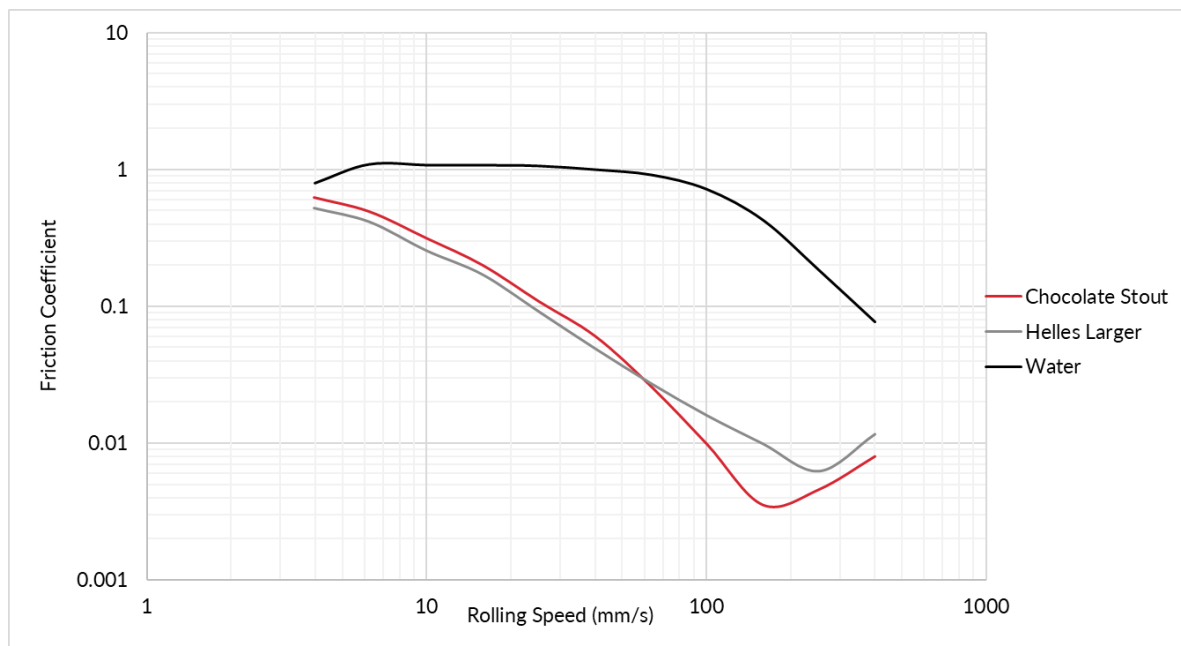
With the help of our local craft beer shop we selected two beers with a large change in the mouthfeel.

- The chocolate stout is 6% ABV. It is described as a deluxe chocolate & vanilla stout. And a gentle bitterness with a smooth mouthfeel.
- The Helles Larger is 4.7 % ABV. With a dry mouthfeel.

Both were tested in a standard Tribometer, with PDMS ball and disc, mimicking the soft contact of the mouth. A load of 3N and a slide/roll ratio of 50%. Water (de-ionised) was used as a control.

Both beers had the effect of reducing the friction over the entire speed range tested. The speeds most relevant to real life would be on the lower end- up to ~ 20 mm/s. The remaining data helps us understand the characteristics of the beer.

The Helles Larger is likely to have a greater concentration of carbonation, leading to bubbles being formed around the contact – High gas content can collapse the load support of the beer – leading to a "thin" feeling. This can also numb the tastebuds to fully experiencing the flavours of the beer.

The stout appears to support the load better – with less hydrodynamic drag – surfaces separate sooner at lower speeds. The stout will contain more sugars and high molecular weight chemicals from the mash process – these will increase the viscosity and may be influencing the friction at lower speeds. By adsorbing onto the surface of the PDMS (or tongue and palate in the real world)