

Pipe Viscometer

Fall 2009

TO: Engineering Development Branch

FROM: Engineering Division

SUBJECT: Delivery of Methocel Solution

The Plant Design Division is working on the preliminary design of a new plant that uses a dilute solution of methocel (cellulose ether) in water. A delivery system for bringing the solution in from the railway terminal to the plant must be part of the design. However, a pipeline already exists from the terminal to a location near the new site, with a safety rupture disk at the railway end of the pipeline. Please determine if the existing system is adequate to deliver the methocel-water solution to the plant at the desired rate without blowing out the rupture disk (this would save us considerable money). If not, please recommend a pipe system that would be adequate for the job. In either case, please indicate the discharge pressure needed for the pump that must be installed at the railway end of the system.

We have a tank of the methocel solution in our laboratory that is the same concentration as we need to deliver. As you know, methocel-water solutions are non-Newtonian, but we aren't sure that its rheology (pressure drop vs. flow rate) follows one of the conventional relationships. We will be waiting for your recommendation.

Specifications:

Methocel concentration: 1.00 wt%

Delivery distance from railway terminal to site: 600 ft

Required flow rate to the plant: 75 gal/min

Rupture-disk rating: 250 psig

Characteristics of existing pipe: 2-in schedule 40 steel pipe