



## LR-20 Pump Features and Data Sheet

## Mechanical Properties

Parameter	Value
Flow Rate Per Revolution	2.7 ml (0.09 fl.oz.)
Minimum Resolution	1.35 ml (0.045 fl.oz)
Number of Boluses	2
Baseline accuracy <sup>(1)</sup>	+/-1% at +/-3 SD
Operating Speeds	1 – 10 RPS
Average Drive Torque	250 mNm <sup>(2)</sup>
Max Drive Torque	500 mNm
Max Operating Life	12 Litres

(1) At 5 RPS with water and no backpressure

(2) At 5 RPS with water and no backpressure





## Dispense Properties

Pump Type	Ready to Drink	Post Mix	High Viscosity	High Output Pressure	Regulated Output Pressure	Long Pipe Runs	High Vacuum
Standard	✓				✓		✓
High Pressure			✓	✓		✓	✓
Dilution		✓	✓	✓			

## Sterilization Properties

Sterilization Method	Dose [kGy]
X-Ray	27.1 – 28.3
E-Beam	25.4 – 46.0

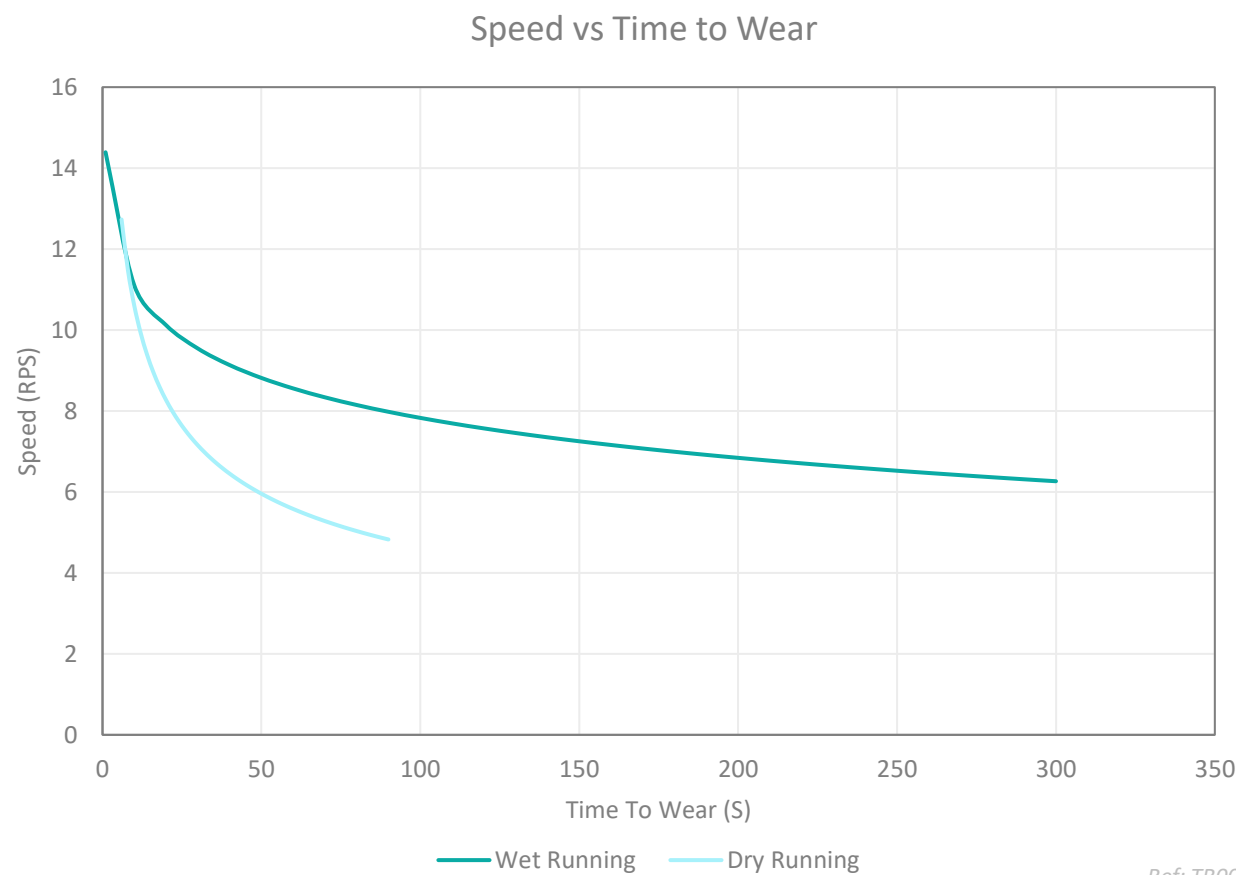
The following table shows the different nozzles that can be used with the Quantex LR-20 Pump. Custom fittings can be designed on request.

Fitting	Name	Standard Pump	High Pressure Pump	Dilution Pump
	Barb Connector	✓	✓	
	Mixer Nozzle with valve			✓
	CryoVac Nozzle	✓	✓	
	Elbow Connector with optional particulate valve (in development)	✓	✓	

Ref: PR003

The following chart shows the duty cycle\* for a LR-20 pump with lubricated rotor for wet and dry running. Operation under the curve will dispense pack volume with a safety factor of 5 (typically 5x1L).

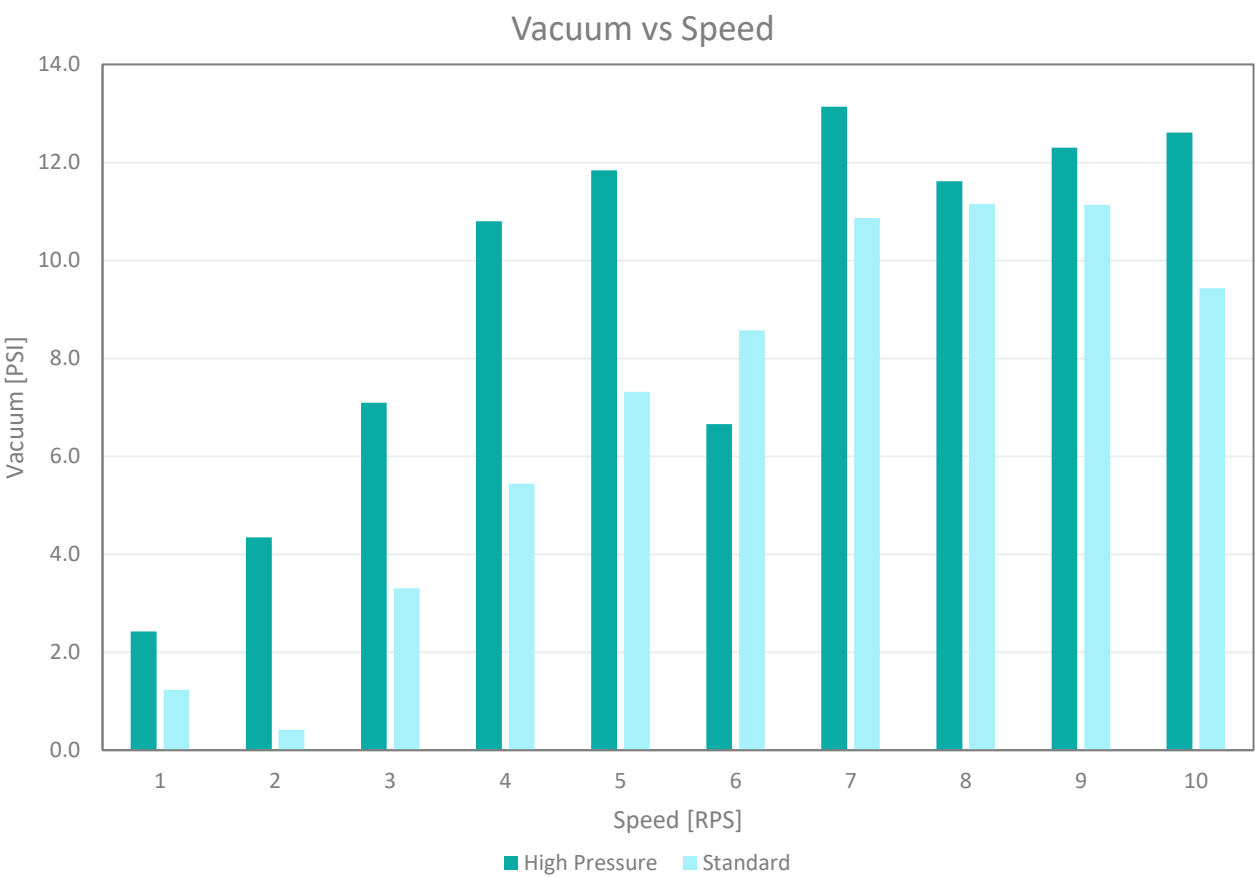
*\*The maximum time that the pump can be run continuously at a particular rotation speed (RPS)*



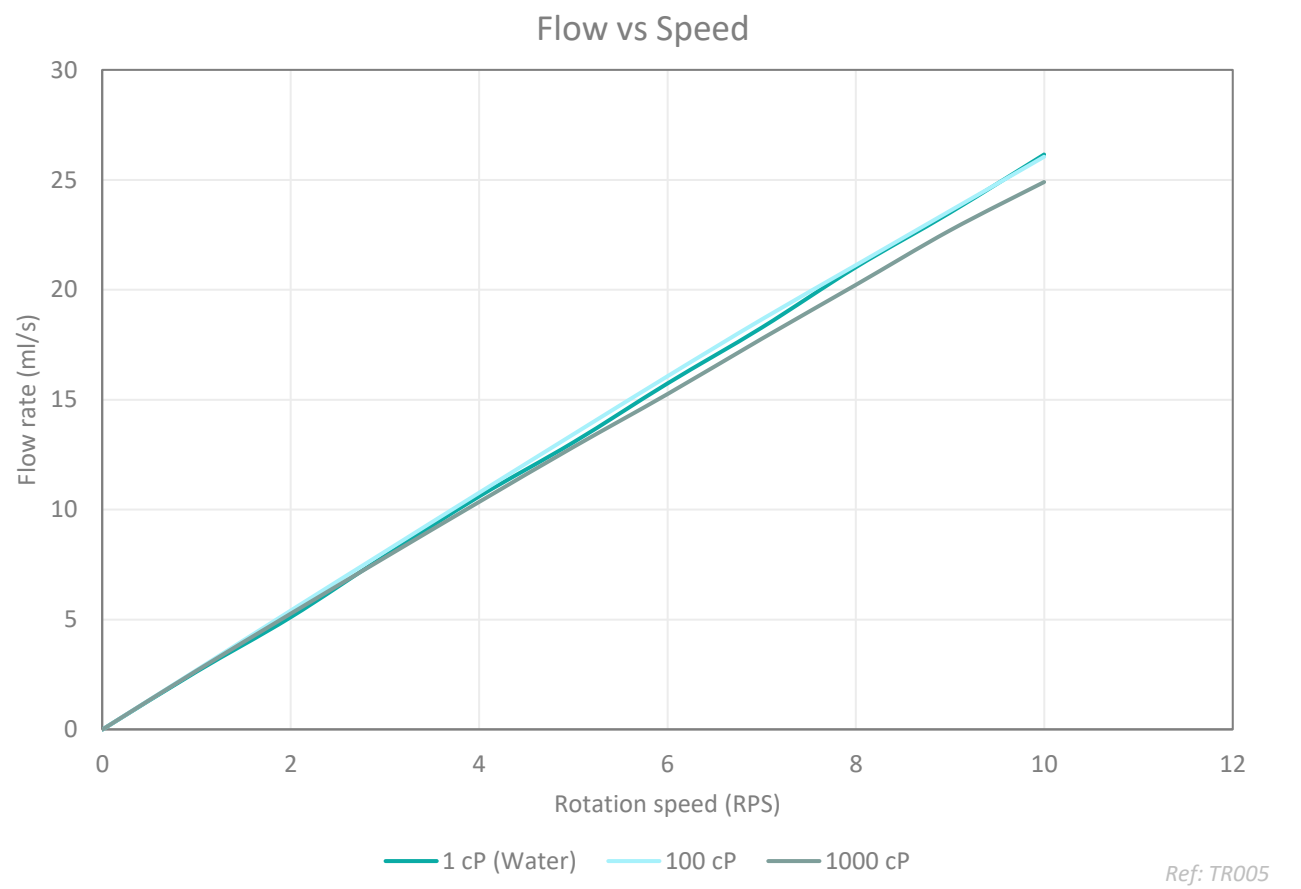
Ref: TR007

Ref: 200922

The following graph shows the maximum vacuum that the LR-20 pump can achieve at a given speed. To get the maximum time the pump can run at a particular speed, refer to the graph on page 4.

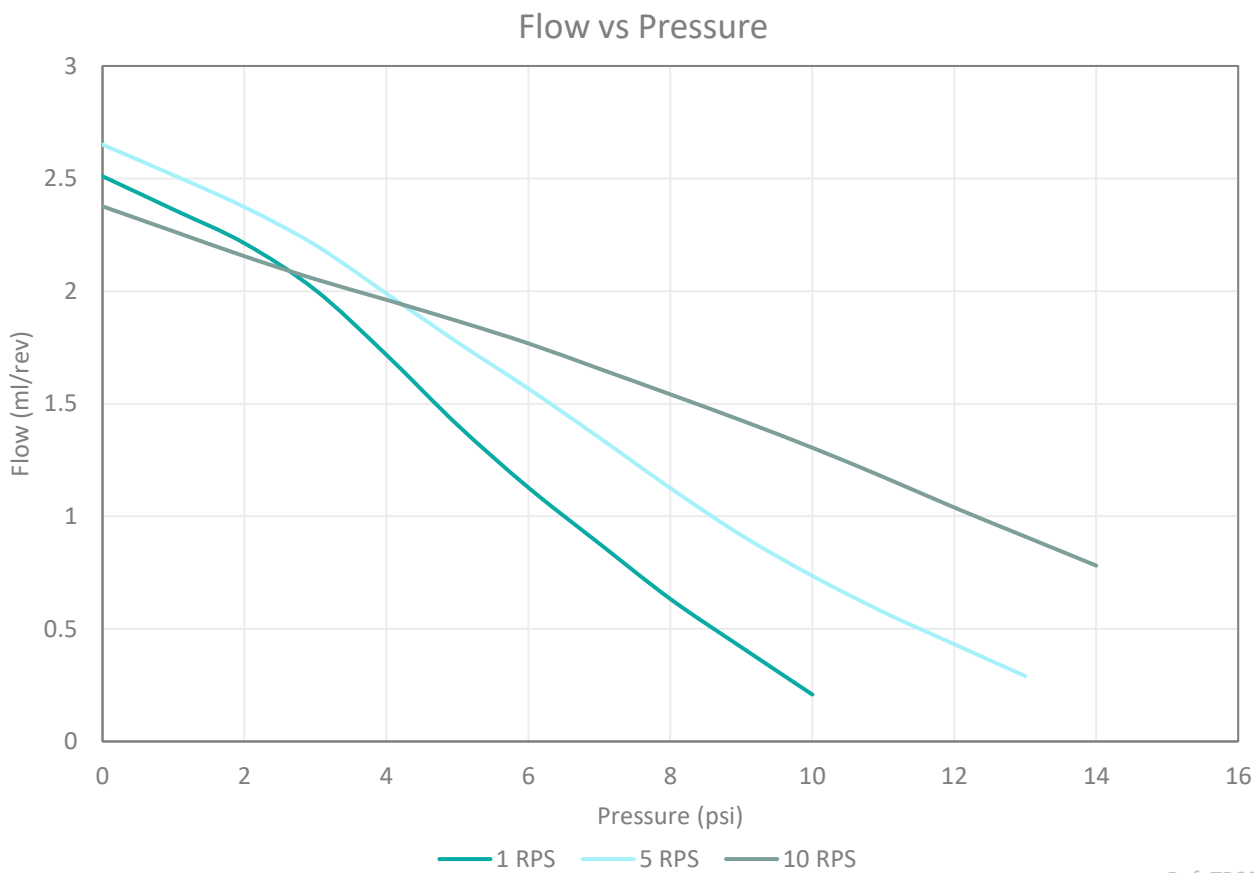


The following chart shows the flow rate performance of a Quantex LR-20 Standard Pump with different viscosities and rotation speeds. The liquid used is a glycerol-water mixture at 20C.



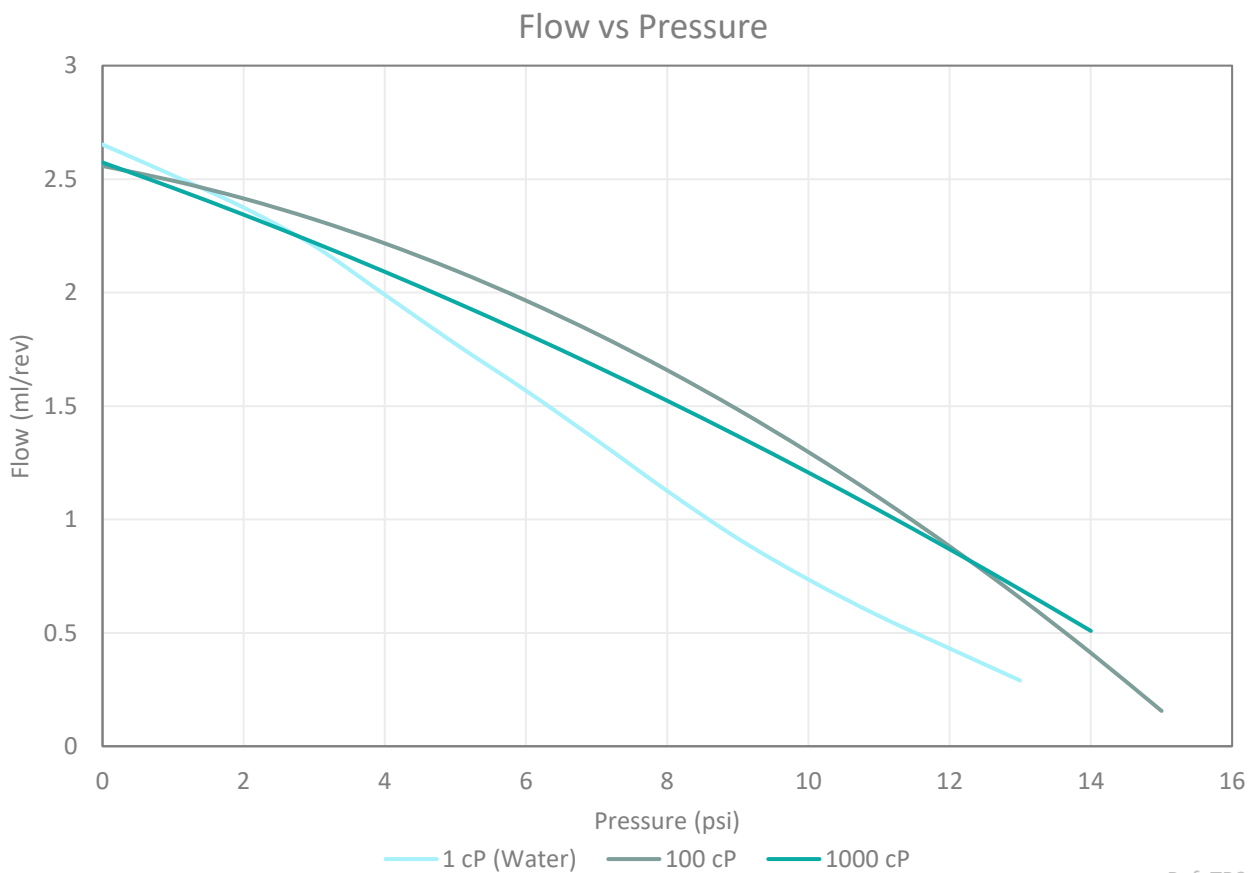
\*\*\*Please note that the accuracy of the pumps may be compromised if running at very low speeds. It is recommended, therefore, to either use a duty cycle when running pumps at low speed, or to choose a smaller pump if there is a requirement for a low flow rate.

The following chart shows the performance of a Quantex LR-20 Standard Pump against back pressure at different rotation speeds with water.

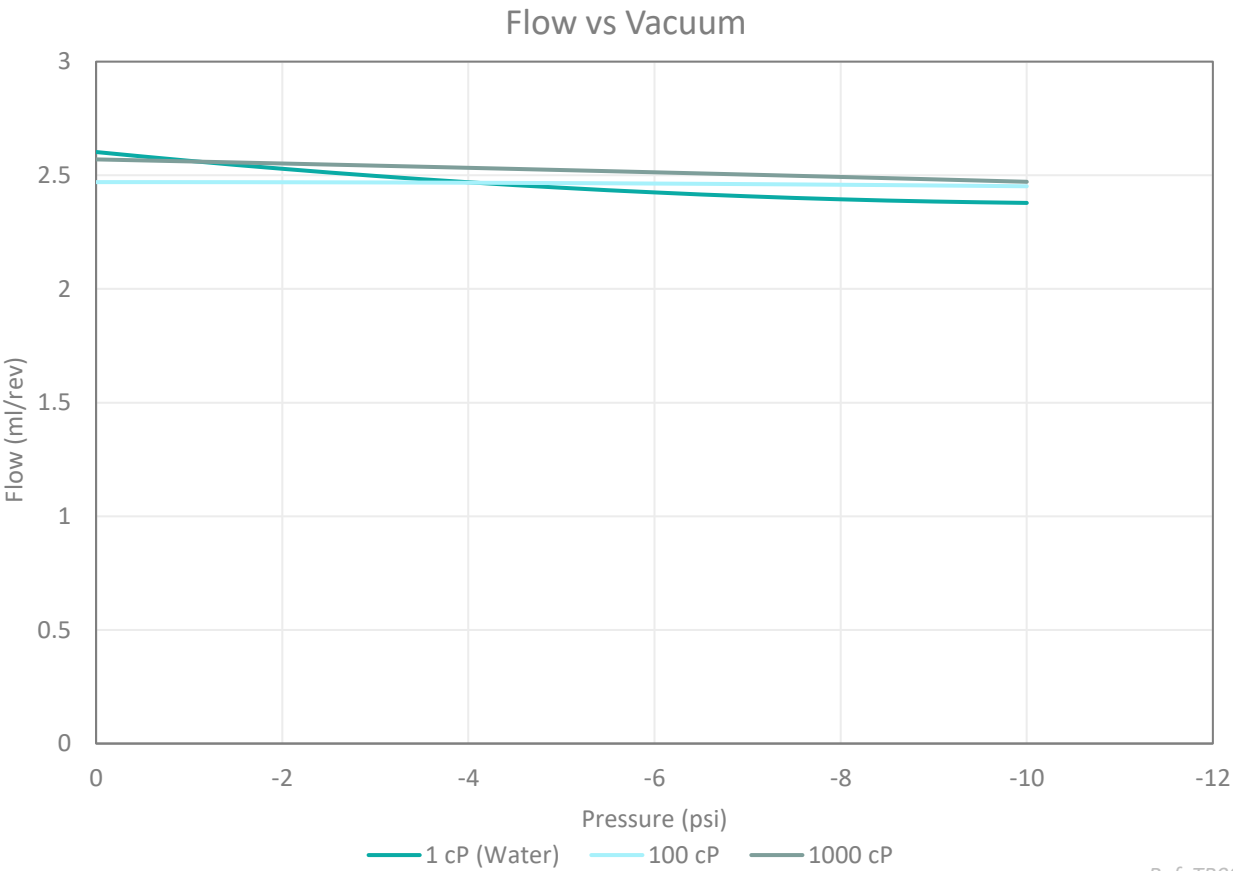




The following chart shows the performance of a Quantex LR-20 Standard Pump for different viscosities against back pressure at 5 RPS. The liquid used is a glycerol-water mixture at 20C.

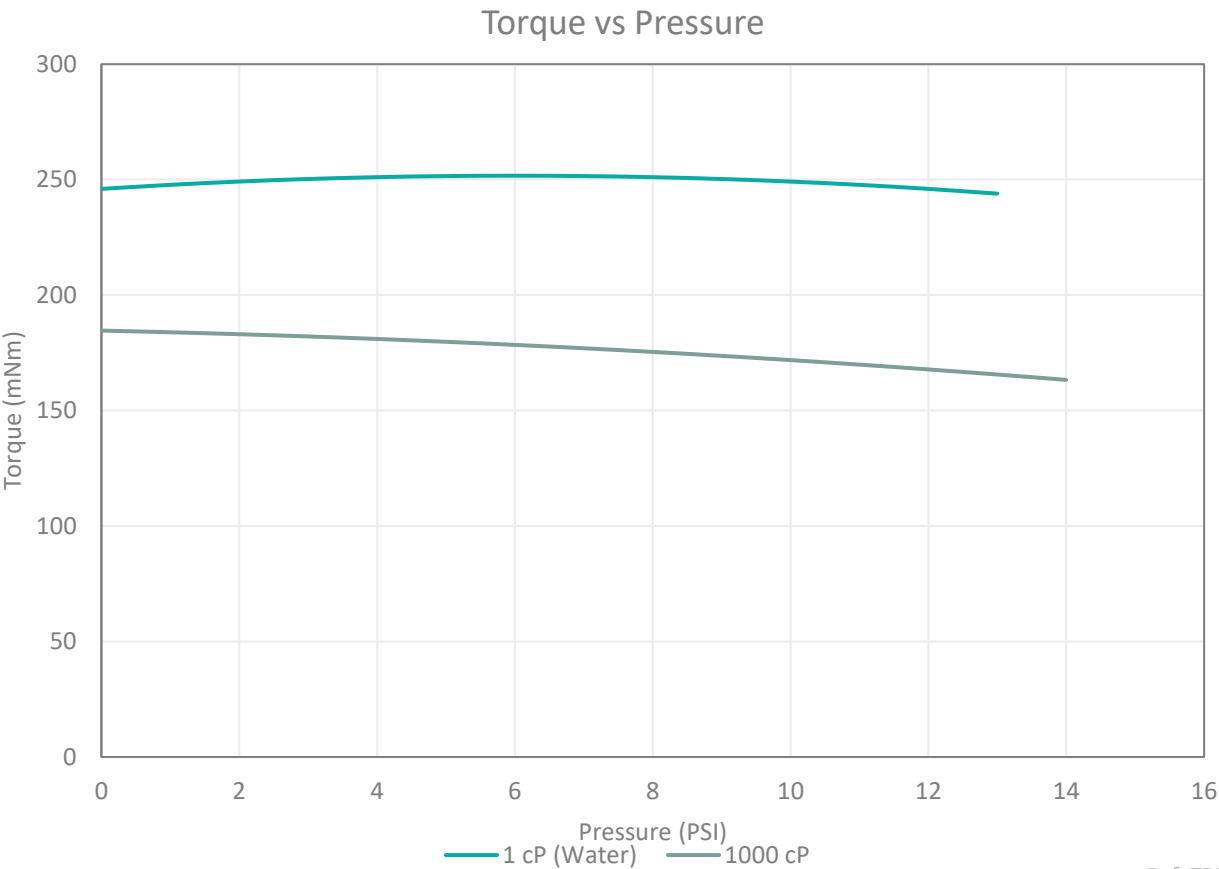


The following chart shows the performance of a Quantex LR-20 Standard Pump against vacuum with different viscosities at 5 RPS. The liquid used is a glycerol-water mixture at 20C.

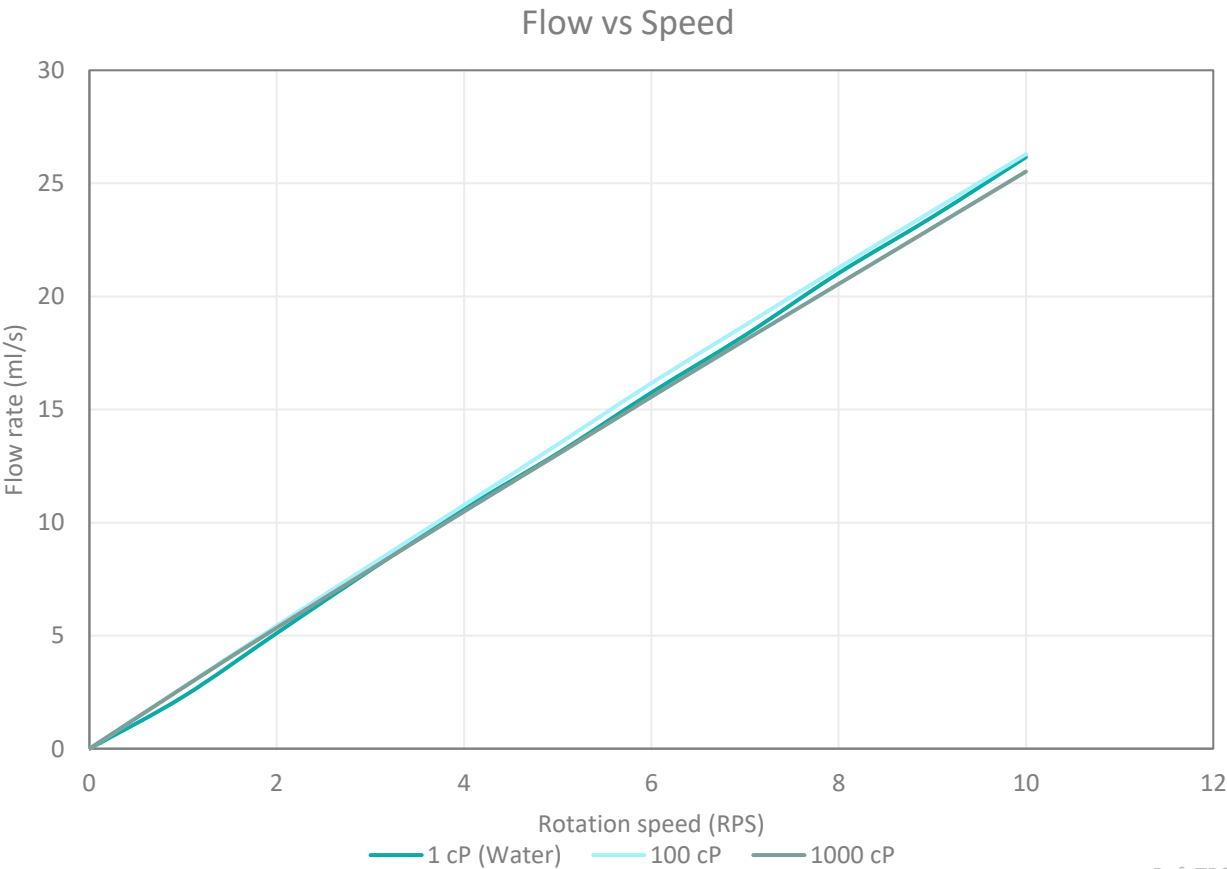


The following chart shows the torque of a Quantex LR-20 Standard Pump for different viscosities and back pressures at 5 RPS. The liquid used is a glycerol-water mixture at 20C.

*The difference in torque is the consequence of the varying lubricity of the test liquid.*

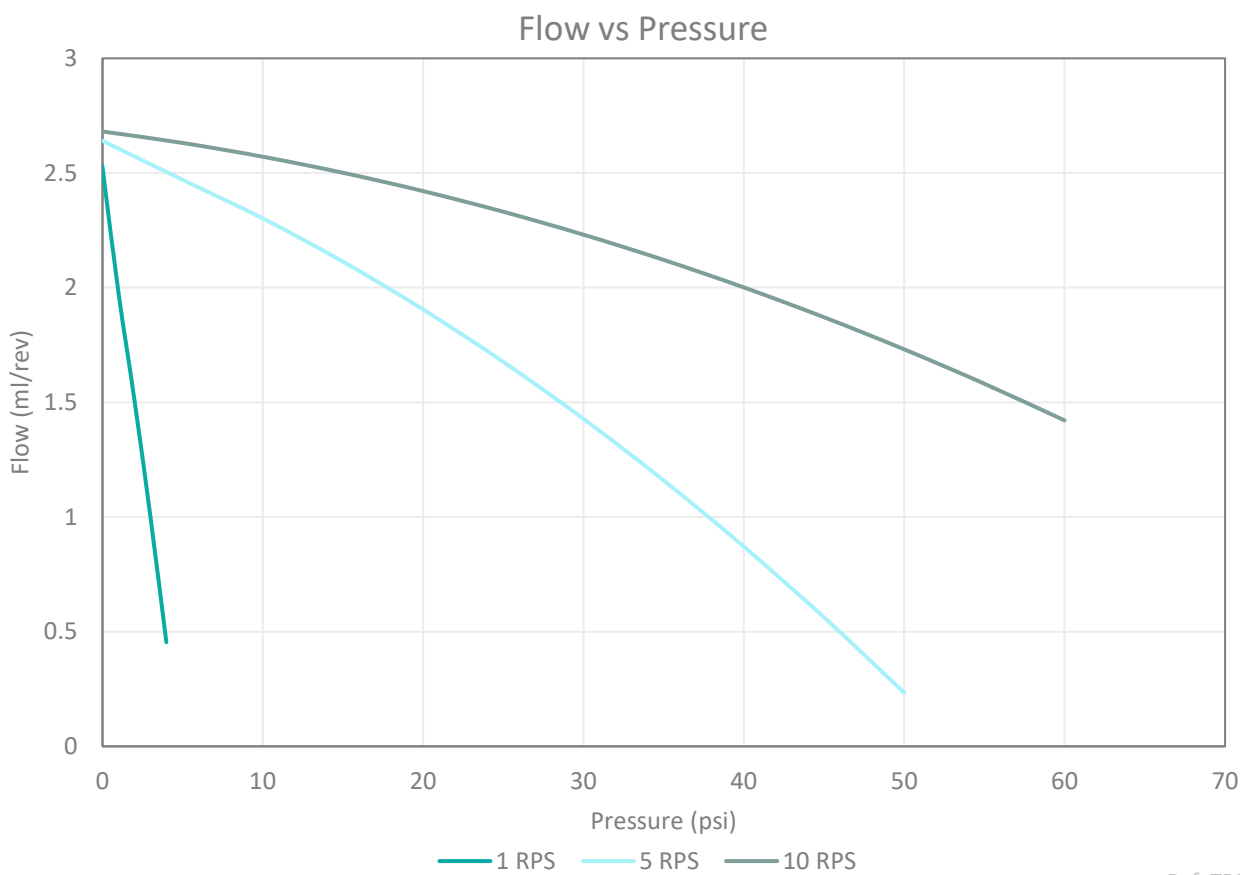


The following chart shows the flow rate performance of a Quantex LR-20 High Pressure Pump at different viscosities and Rotation Speeds. The liquid used is a glycerol-water mixture at 20C.



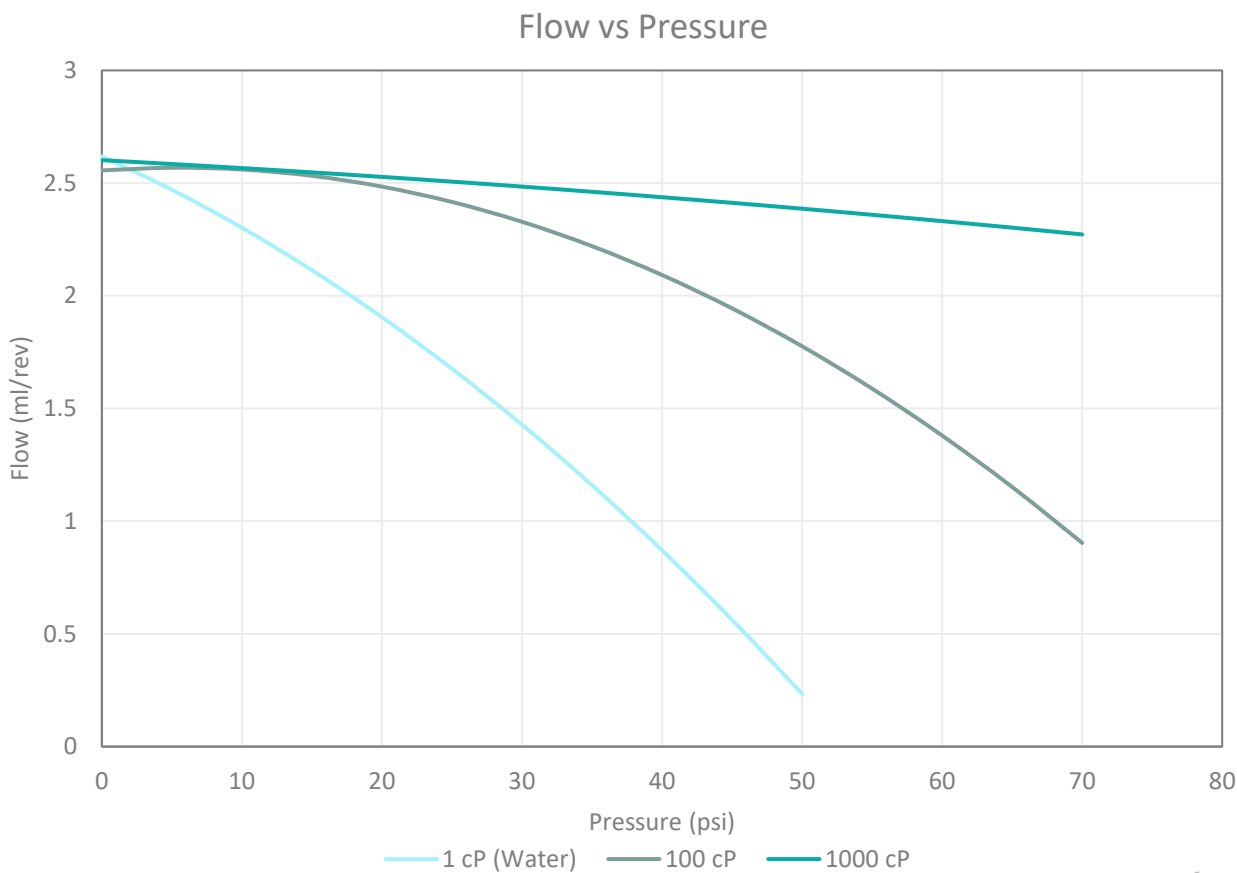
\*\*\*Please note that the accuracy of the pumps may be compromised if running at very low speeds. It is recommended, therefore, to either use a duty cycle when running pumps at low speed, or to choose a smaller pump if there is a requirement for a low flow rate.

The following chart shows the performance of a Quantex LR-20 High Pressure Pump against back pressure at different rotation speeds with water.

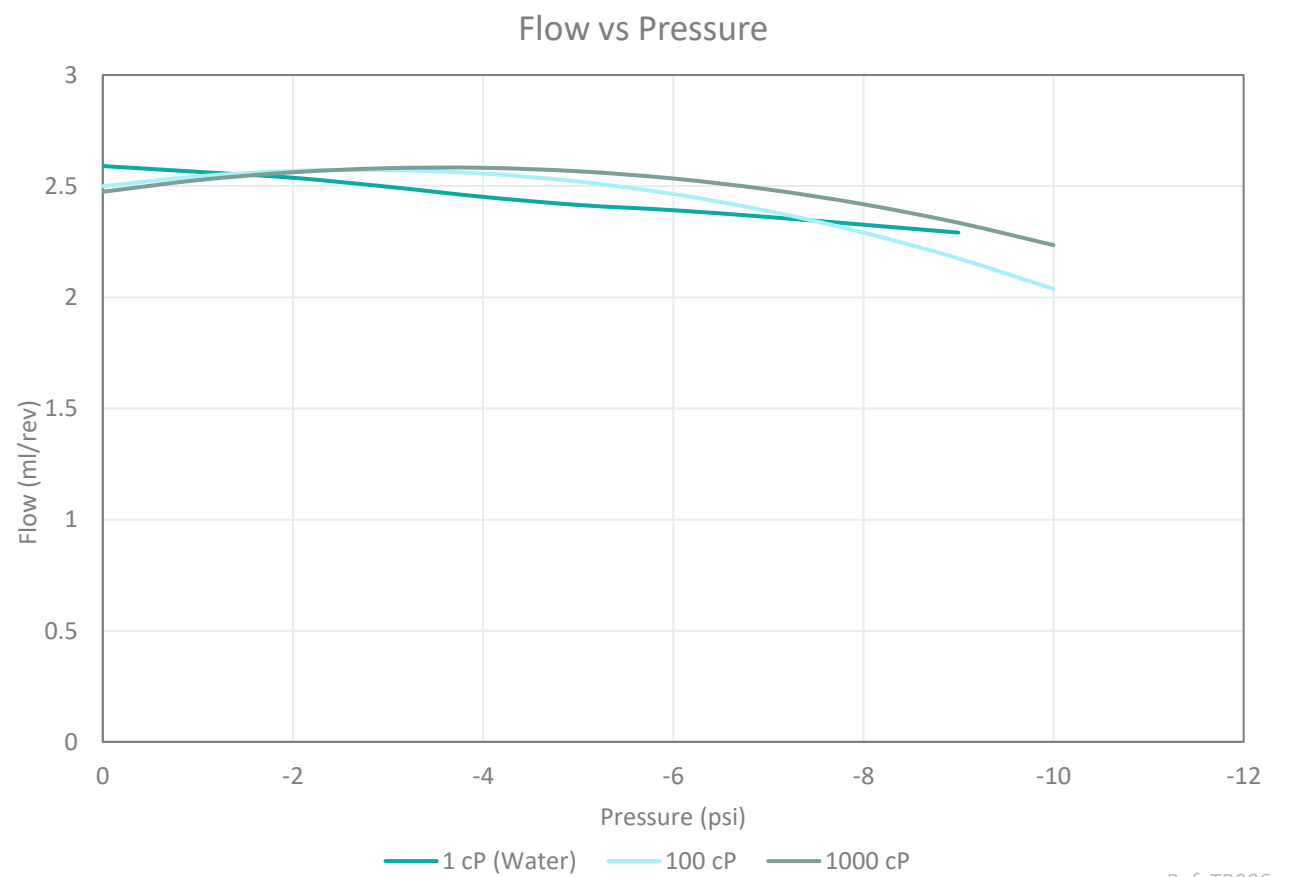


Ref: TR006

The following chart shows the performance of a Quantex LR-20 High Pressure Pump for different viscosities against back pressure at 5 RPS. The liquid used is a glycerol-water mixture at 20C.

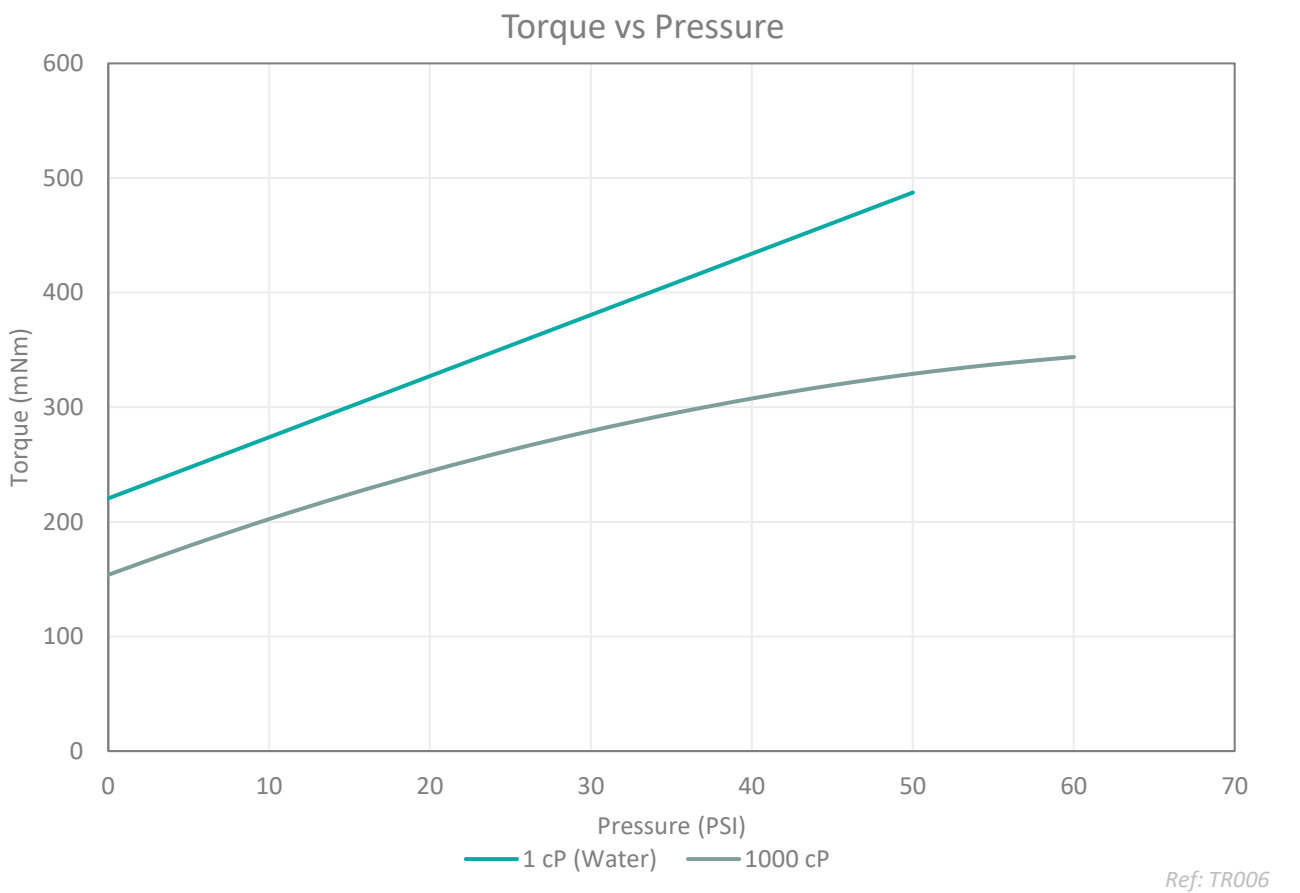


The following chart shows the performance of a Quantex LR-20 High Pressure Pump against vacuum with different viscosities at 5 RPS. The liquid used is a glycerol-water mixture at 20C.



Ref: TR006

The following chart shows the torque of a Quantex LR-20 High Pressure Pump at 5 and 10 RPS for different back pressures. The liquid used is water at 20C.





A LR-20 dilution pump has the features of a LR-20 high pressure pump, and additionally allows for in-pump dilution. High concentrate liquids can be mixed with water in any desired ratio from 1:1 to 1:30.

The reliability of this pump has also been preliminary evaluated for hot water dispensing (i.e., beverages that require a concentrate and hot water up to 85°C as a diluent), without affecting the mechanical properties of the pump.

The following data shows an example of the performance of the LR-20 dilution pump when used with 68 Brix Apple Concentrate. The top, middle and bottom data are taken from each cup right after dispensing. The liquid in the cup is then mechanically mixed to determine the mean brix value.

<b>Specs</b>	Water to concentrate ratio	6.60 : 1
	Inlet Water pressure	1.5 bar
	Time to fill a 200 mL cup	3 s
<b>Test Data</b>	Mean Cup	11.6 %Brix
	Cup to Cup Spread St. Dev	010 %Brix
	Stratification Spread	<0.3 %Brix

**68 Brix Apple Juice Concentrate Mix Data Across 10 Pumps**

