Testing of the Ecopump

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Business from technology

Testing of the Ecopump

- Measurements were done at VTT's laboratory in Jyväskylä, Finland
- Two Ecopumps were tested
  - Ecopump 130 with Dy 100 mm inlet and outlet
  - Ecopump 195 with Dy 150 mm inlet and outlet
- Ecopump 130 pump was tested with water and with rape seed oil
  - Normal rotational speed range was 240 – 600 rpm
  - Some tests with rape seed oil also at 600 – 1000 rpm
- Ecopump 195 was tested with rape seed oil at 180 – 600 rpm

Measurements included:

- Flow rate Q (l/s), 1 l/s=3,6 m3/h
- Pressure before and after pump p_i and p_o (kPa), 1 kPa=0,01 bar
- Mechanical torque M (Nm)
- Rotational speed n (rpm)

Mechanical power demand P (W) was calculated as:

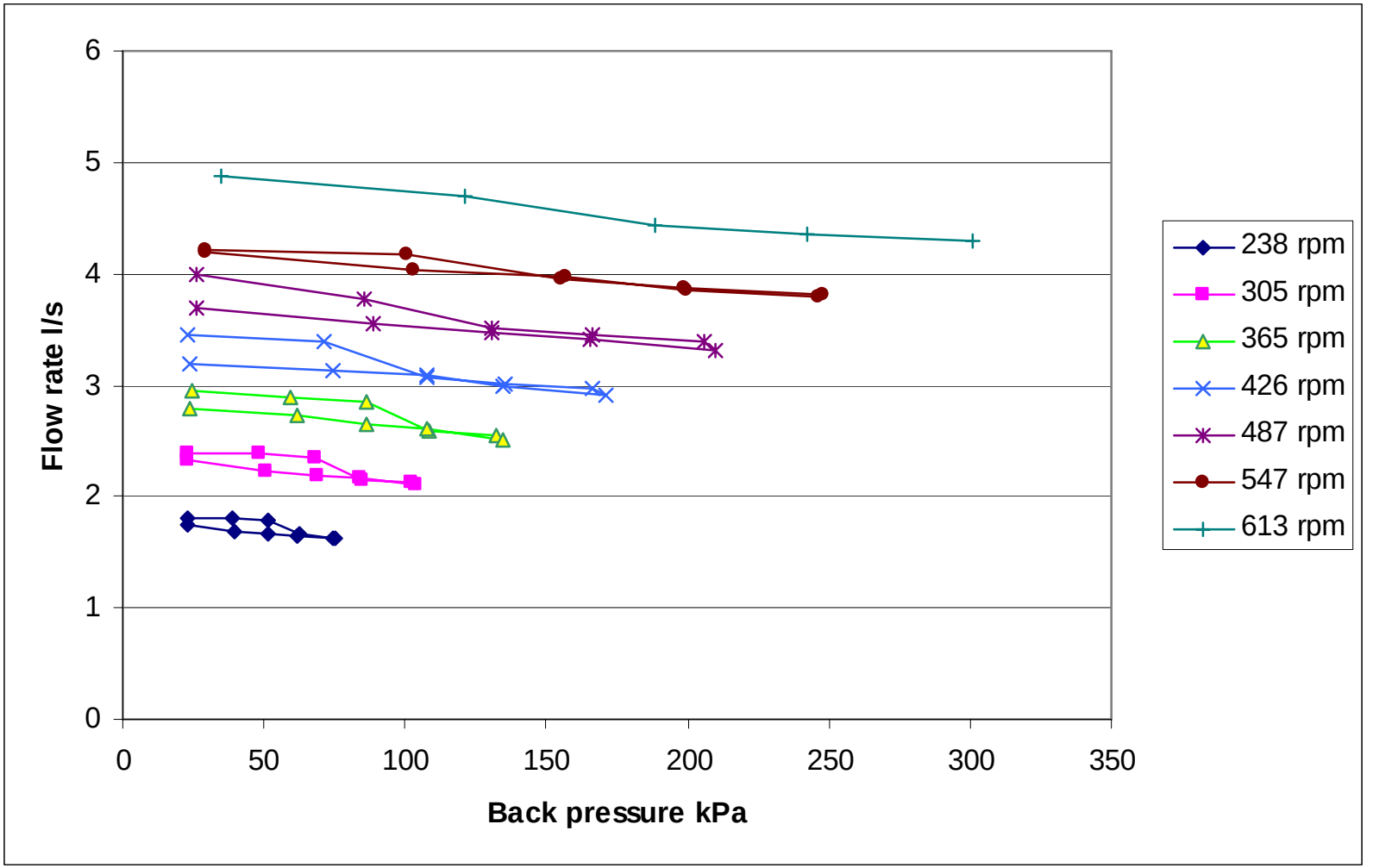
$$P = 2\pi nM/60$$

and mechanical efficiency:

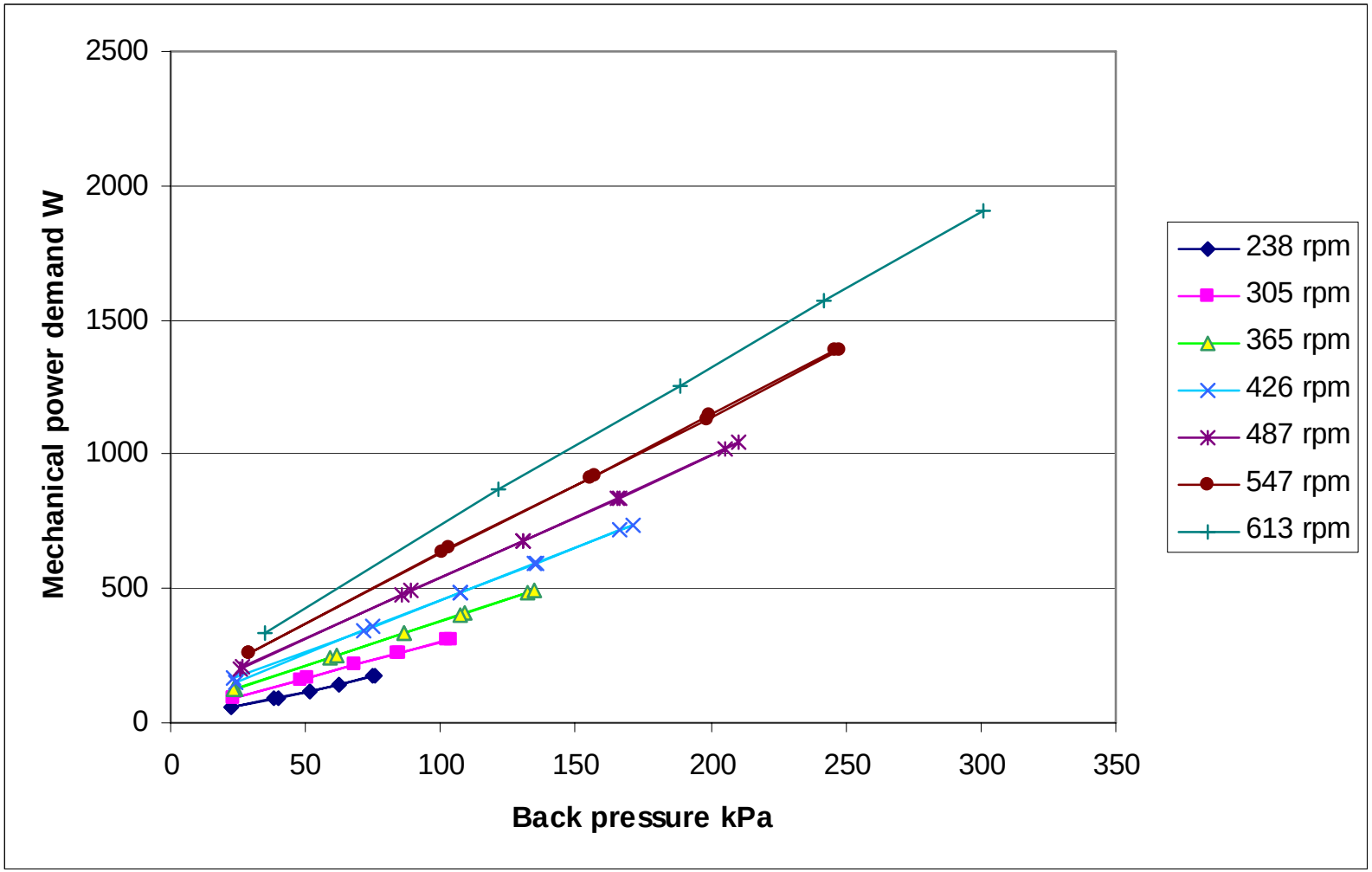
$$\eta = Q(p_o - p_i)/P$$



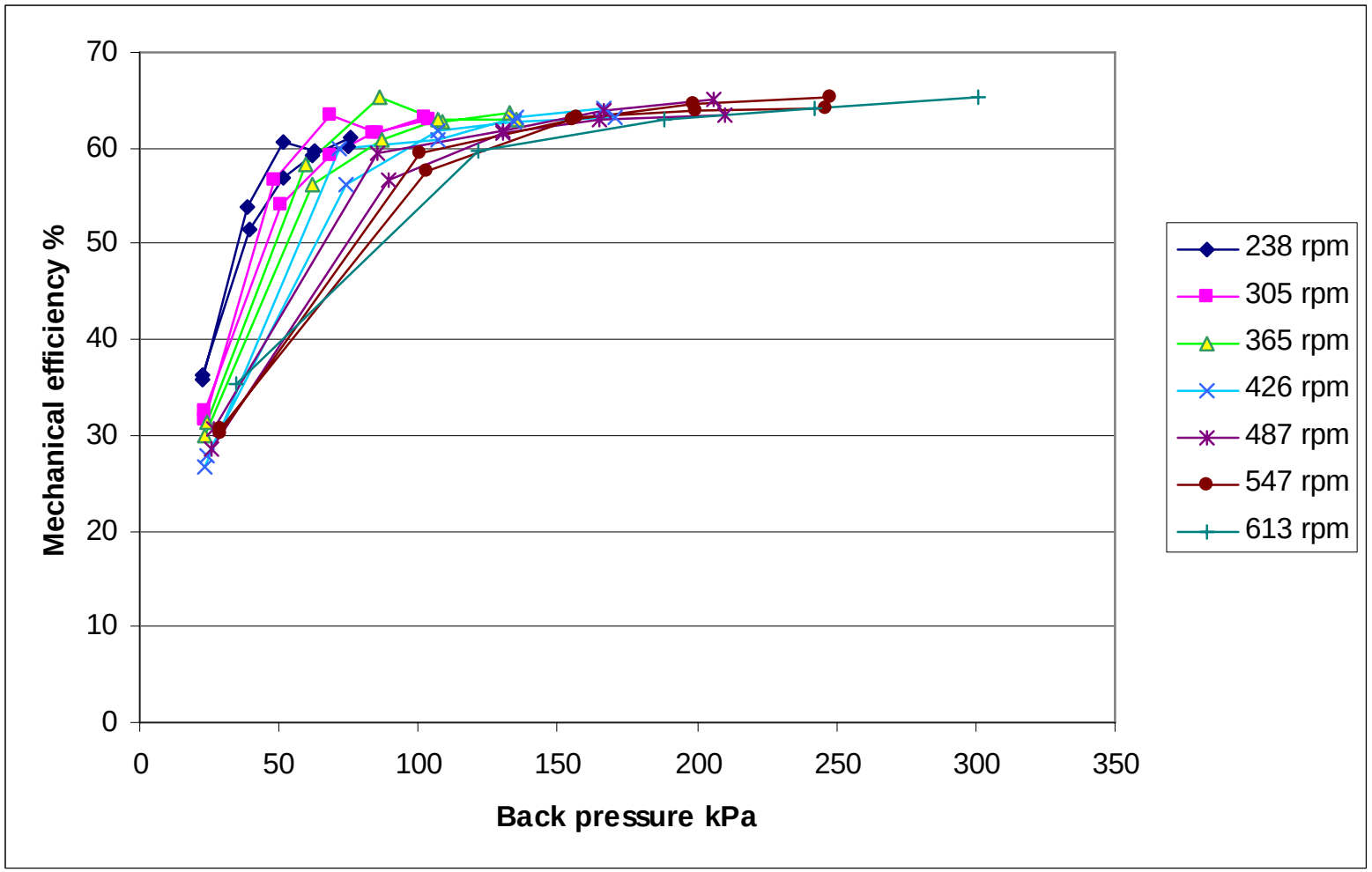
Smaller Ecopump with rape seed oil



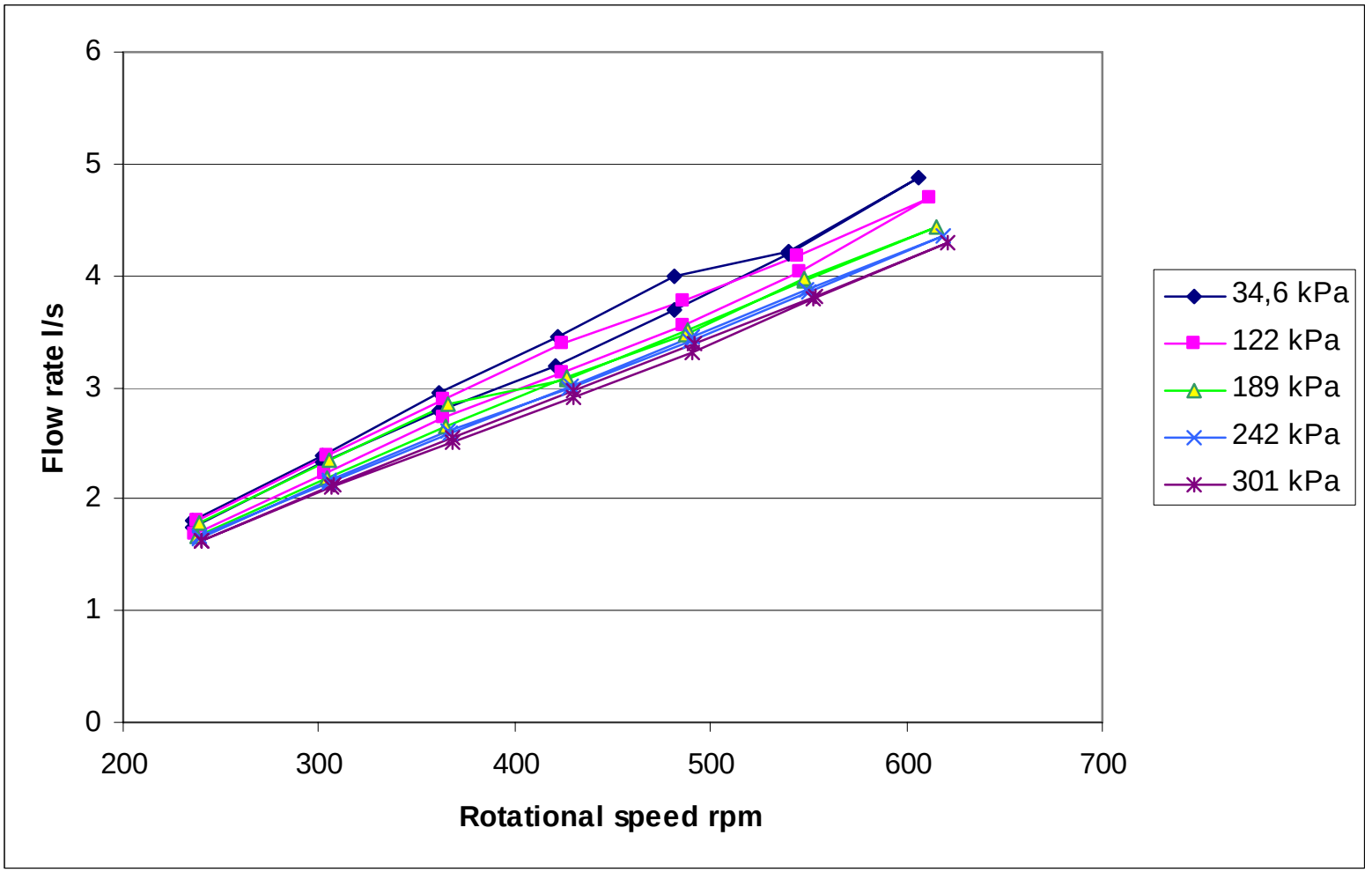
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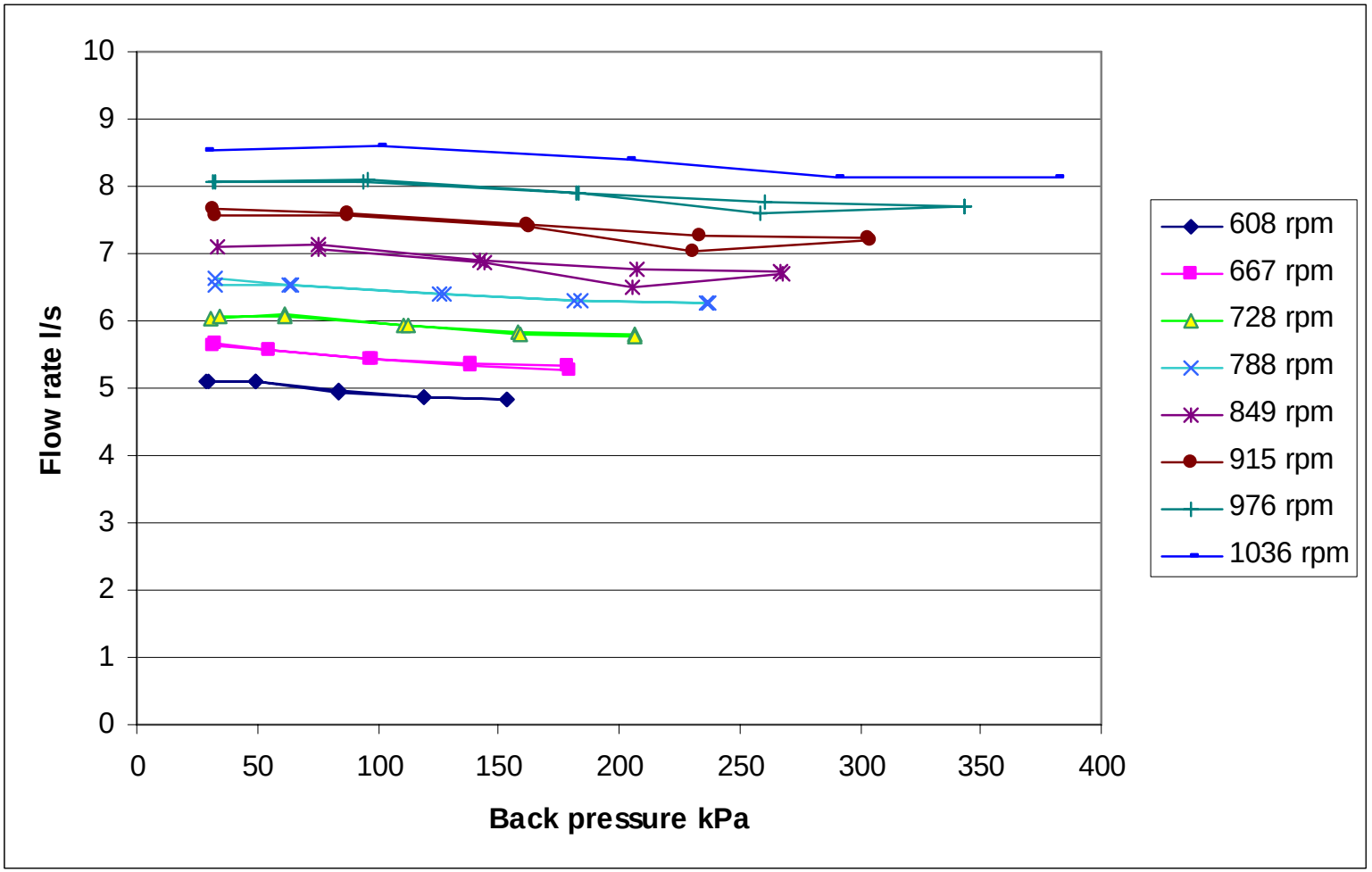
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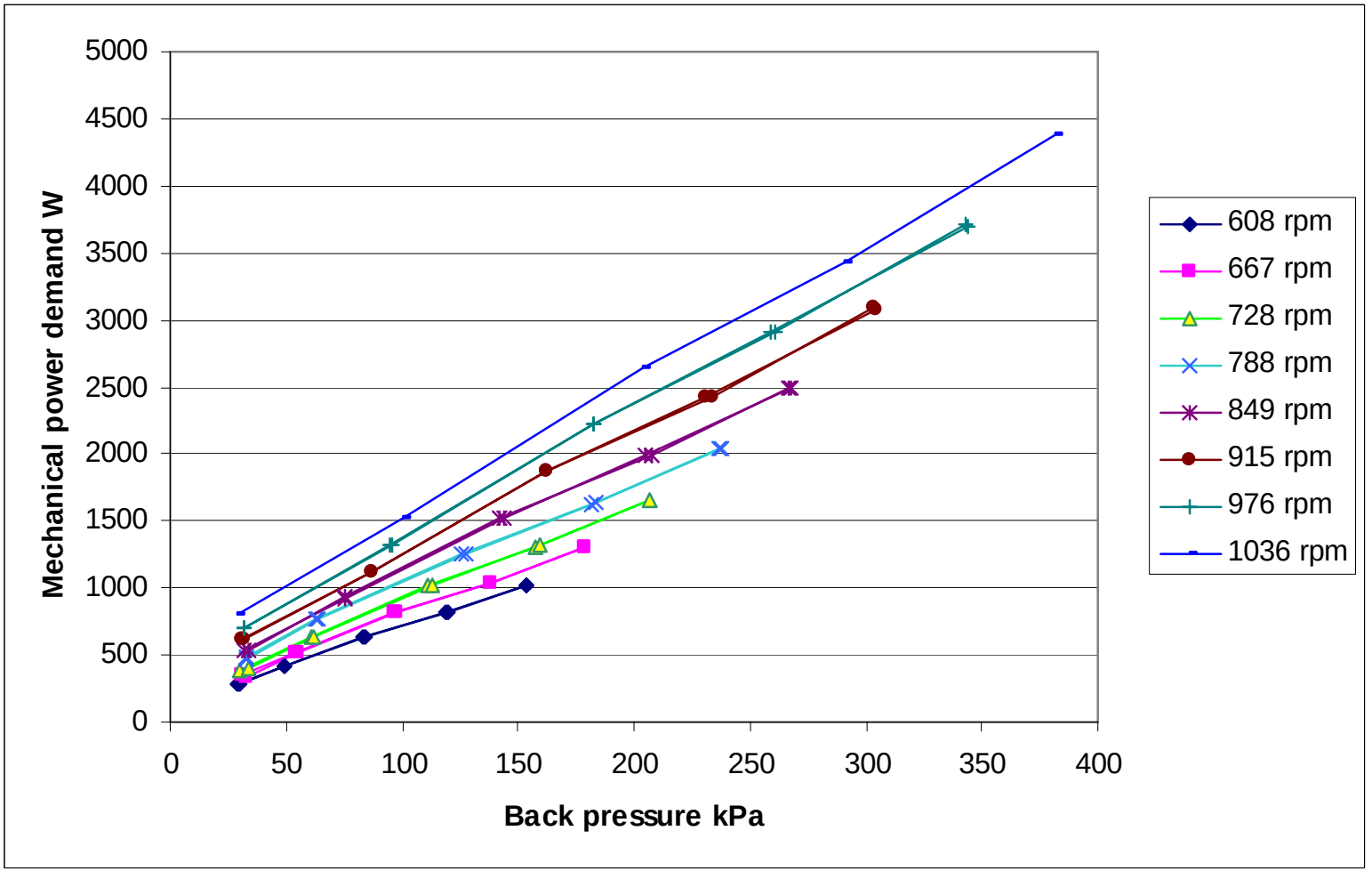
Smaller Ecopump with rape seed oil (max pressures at 600 rpm)



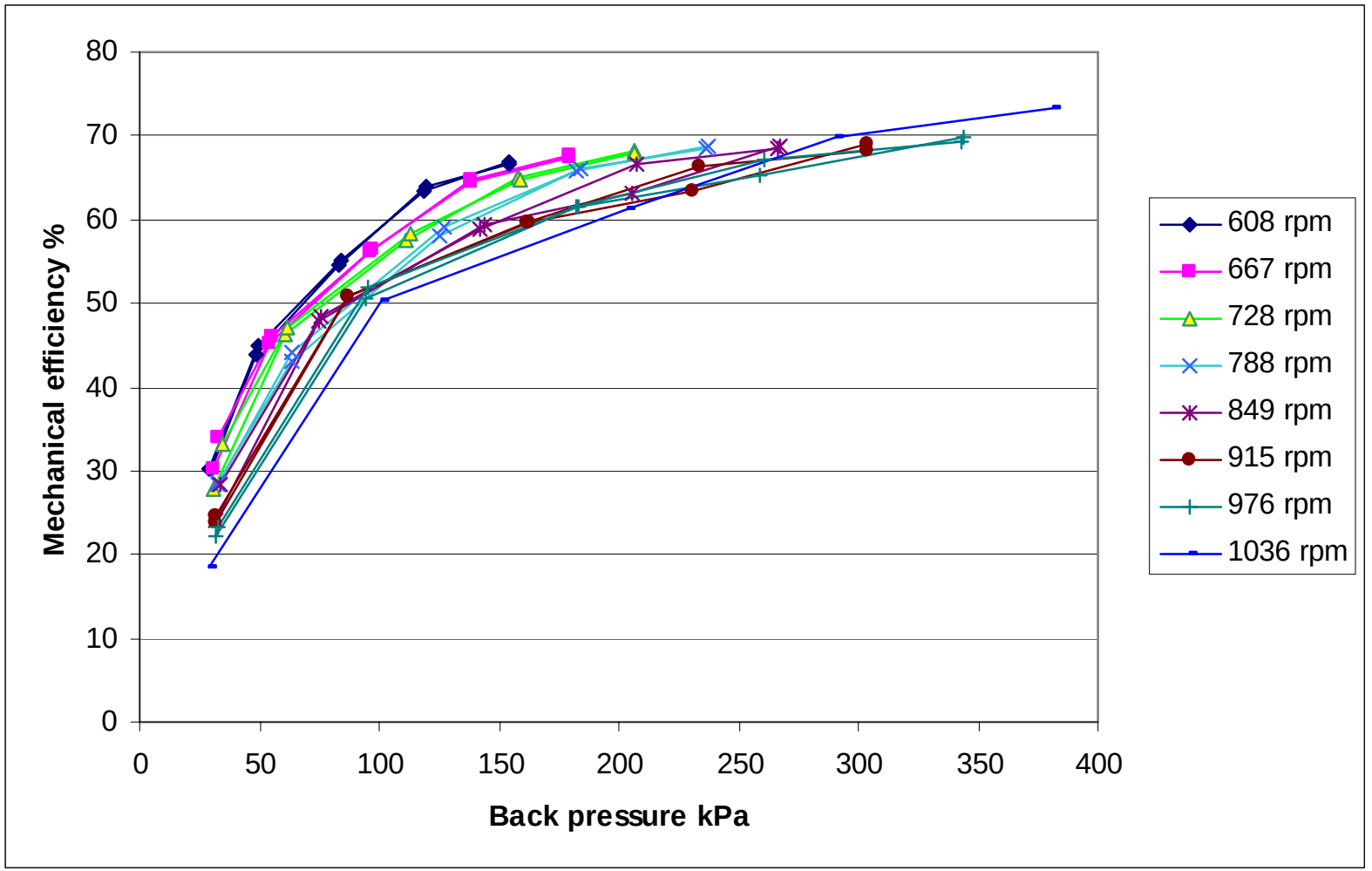
Smaller Ecopump with rape seed oil at higher rpm's



Smaller Ecopump with rape seed oil at higher rpm's

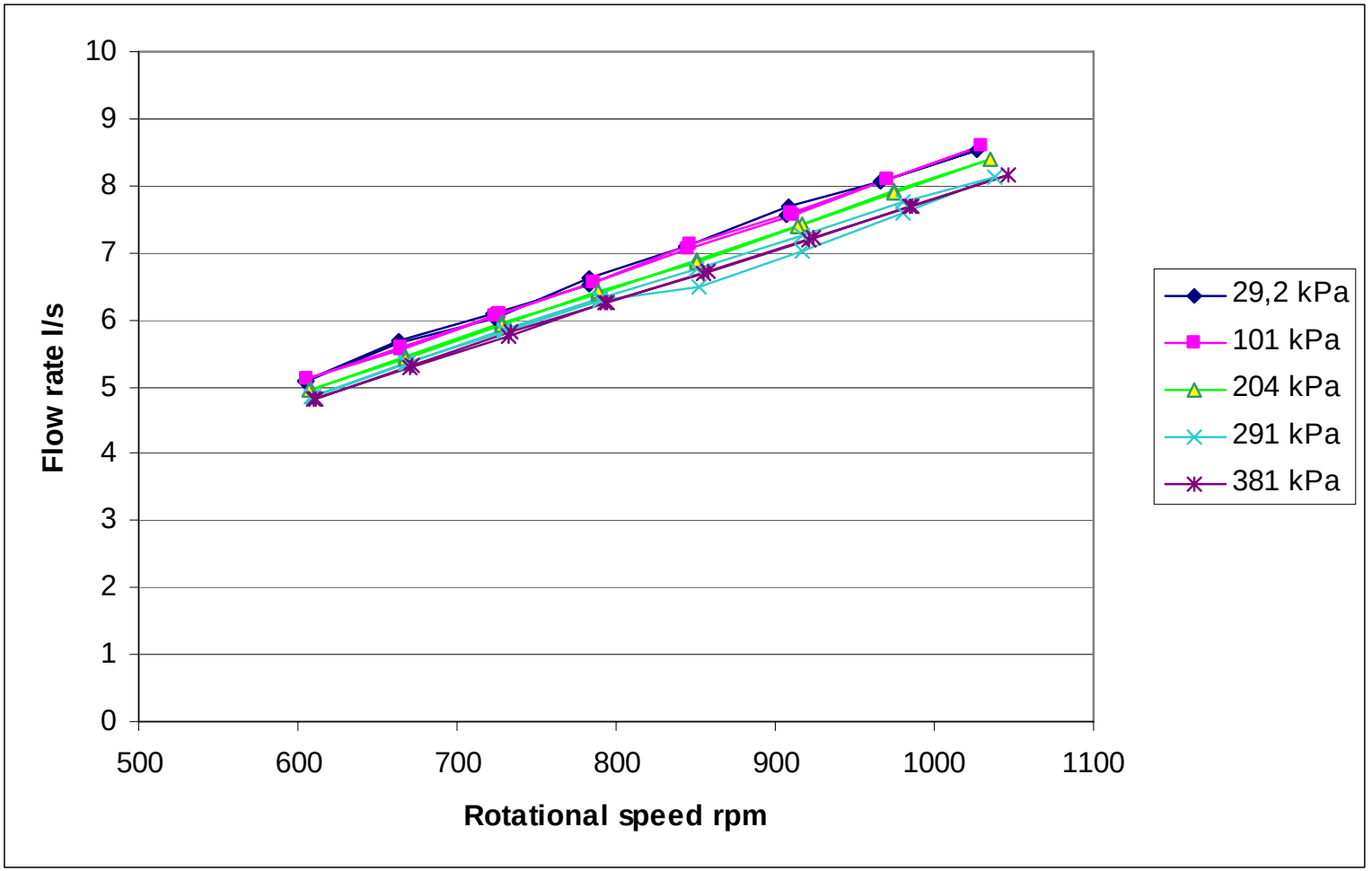


Smaller Ecopump with rape seed oil at higher rpm's



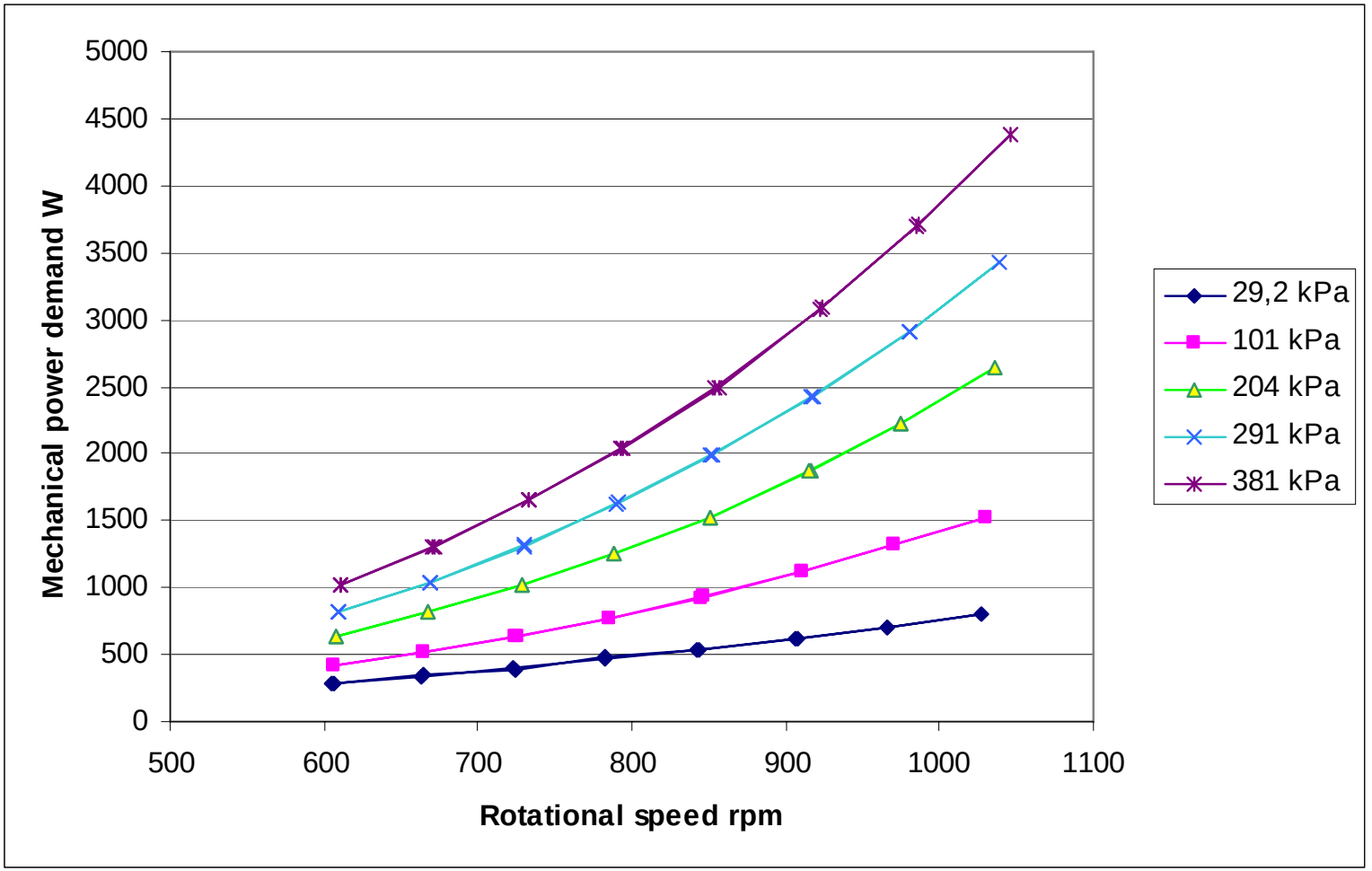
Smaller Ecopump with rape seed oil at higher rpm's

(max pressures at 1000 rpm)

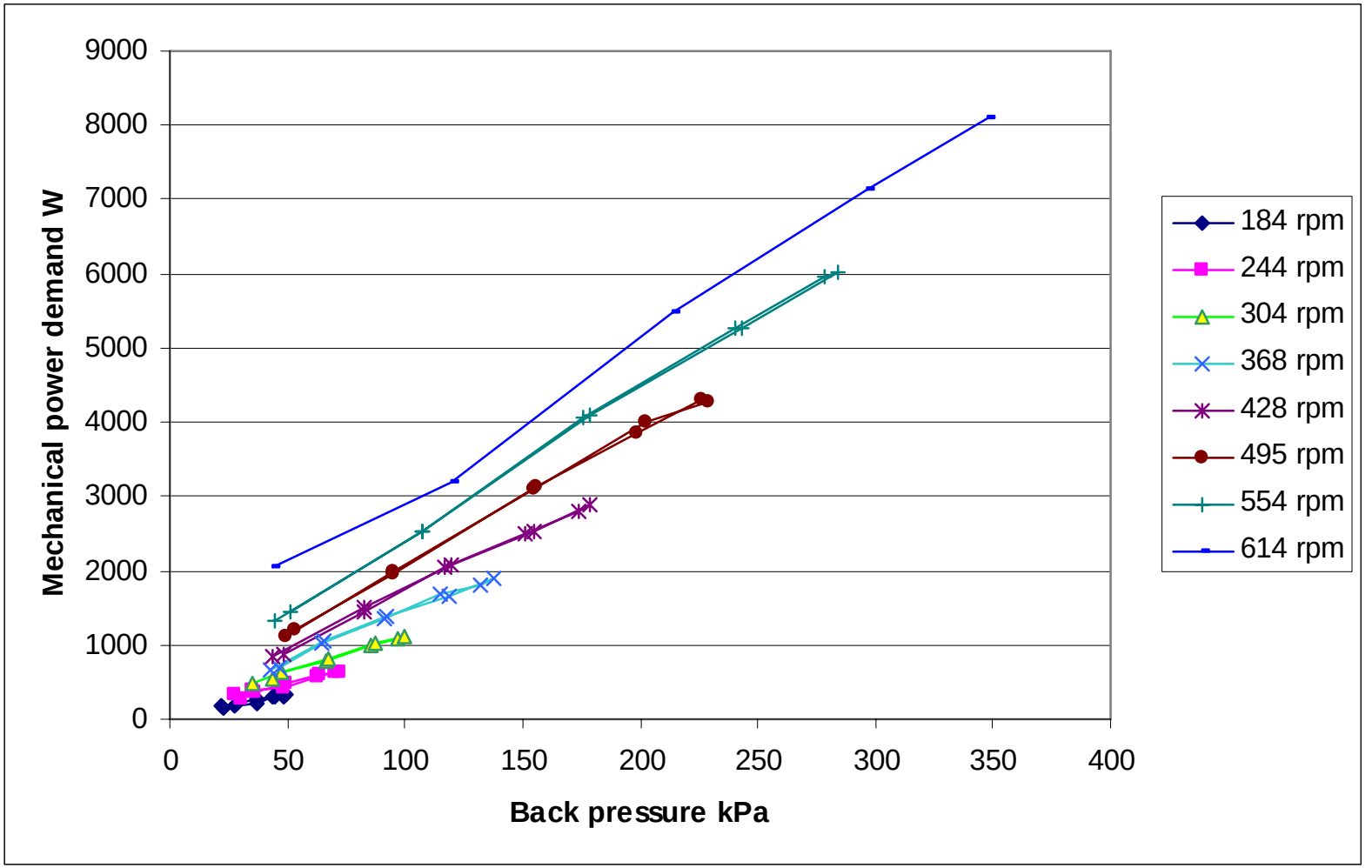


Smaller Ecopump with rape seed oil at higher rpm's

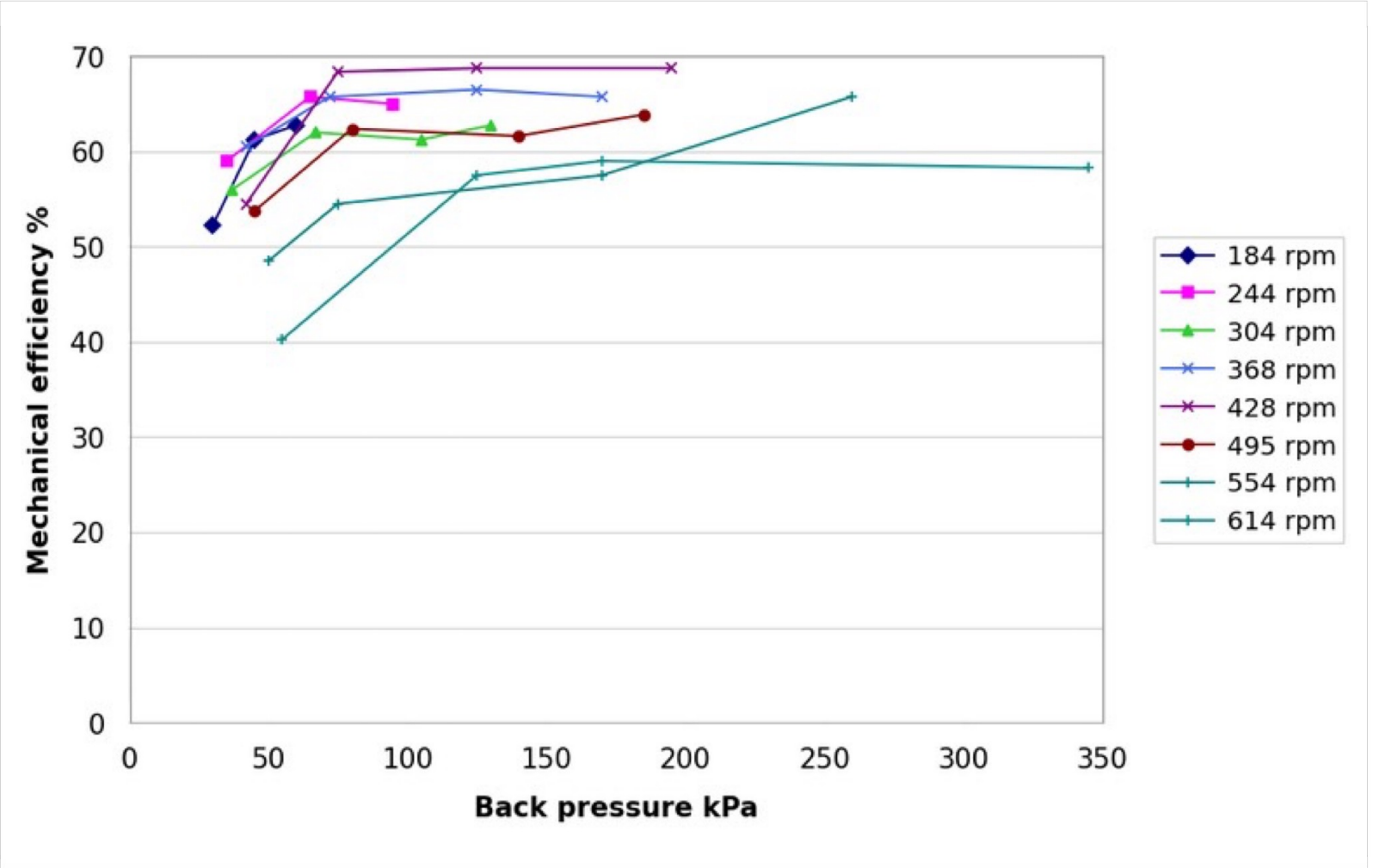
(max pressures at 1000 rpm)



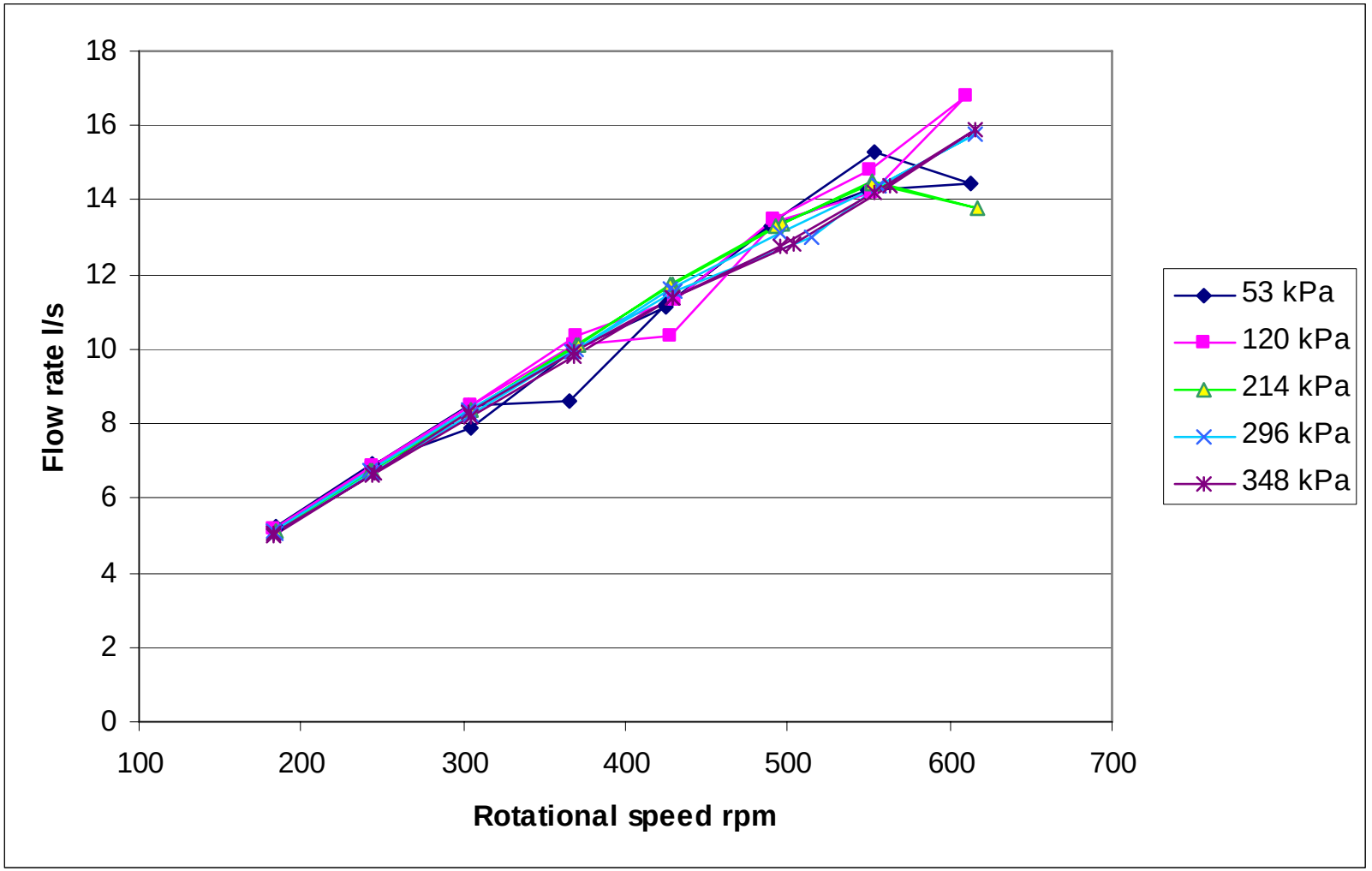
Bigger Ecopump with rape seed oil



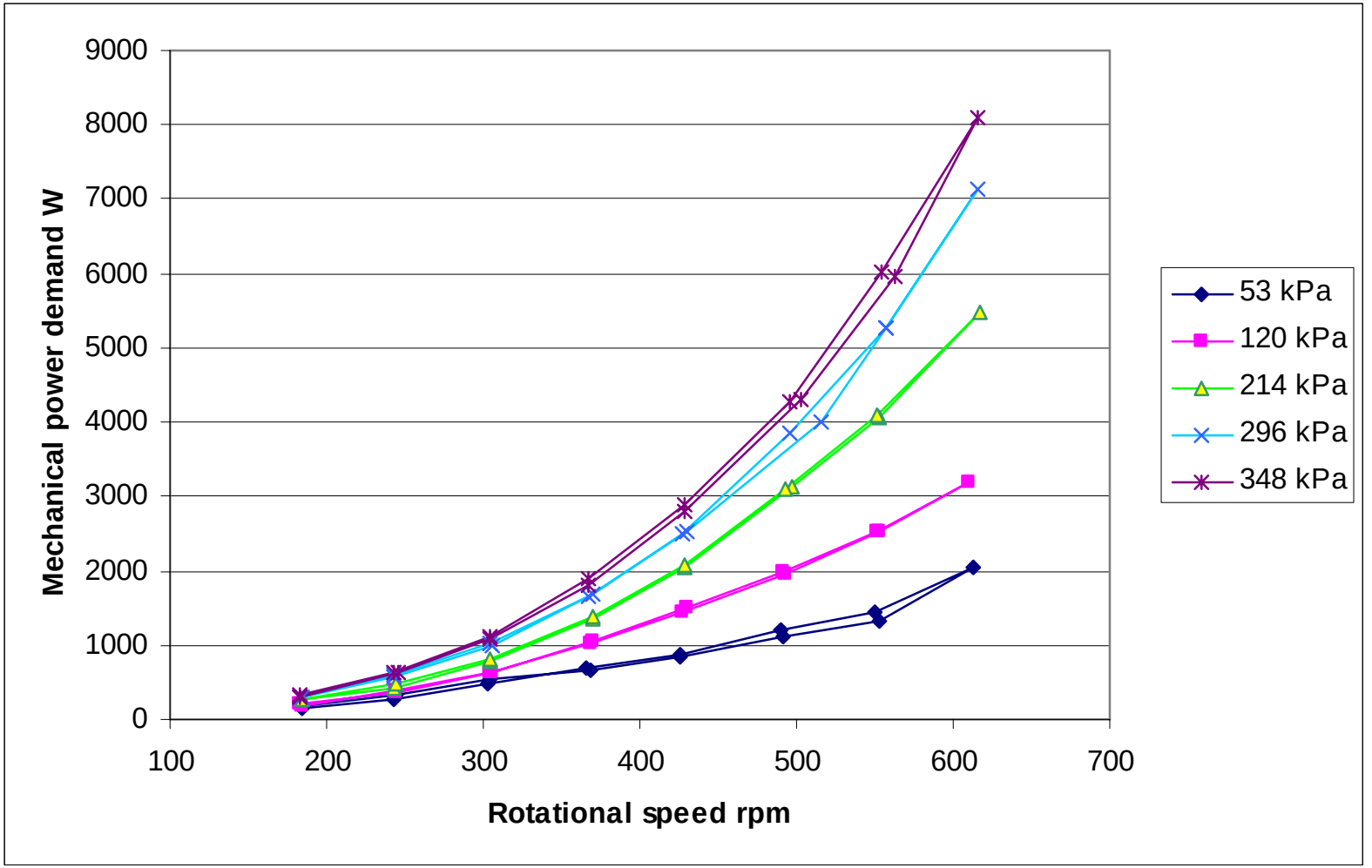
Bigger Ecopump with rape seed oil



Bigger Ecopump with rape seed oil (max pressures at 600 rpm)



Bigger Ecopump with rape seed oil (max pressures at 600 rpm)



Conclusions

- Both of the Ecopumps were running smoothly with rape seed oil
- Flow rates stayed quite constant and not depending of the back pressure
- Flow rates of the smaller pump were 2 – 5 l/s at 240 – 600 rpm and 5 – 8,5 l/s at 600 – 1000 rpm
- Flow rates of the bigger pump were 5 – 16 l/s at 180 – 600 rpm
- With rape seed oil the efficiencies were very good; > 60 % (at higher rpm’s even > 70 %)
- Minimum back pressure of about 50 – 70 kPa is needed for good efficiency

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