PA | PAC | PAD series
piston pumps
fixed displacement in-line design

ADVANTAGES

► Of unique design, the PA, PAC and PAD pumps offer a robust solution with long service life for high pressure requirements in truck hydraulics.

► Relatively insensitive to contamination, these pumps are particularly well suited to the harshest environments.

► The design means the pumps can rotate either clockwise or counter-clockwise without any user intervention.

► Like all truck pumps designed by HYDRO LEDUC, this range is fitted with the latest innovation in terms of sealing:
  
  ▪ Front of pump fitted with two shaft seals: externally, a seal capable of resisting the high temperatures of the gearbox, and internally, a seal adapted to the hydraulic requirements.
  
  ▪ A transparent flexible tube fitted between the two seals, to protect these seals from dirt from the road, and from high pressure water jet during washing of vehicle etc...
The PA, PAC, PAD pump series comprises three ranges, all designed for truck applications at working pressures up to 5800 psi (400 bar) continuous and 7252 psi (500 bar) peak.

**PA pumps**
- single flow from 1.53 to 6.95 cu.in/rev (25 to 114 cc/rev)
- twin-flow from 2x3.05 to 2x4.6 cu.in/rev (2x50 to 2x75 cc/rev)
- two different flows: 4.6-2.4 cu.in/rev (75 - 40 cc/rev)

**PAC pumps**
- Series offering the most compact size envelope:
  - single flow from 2.62 to 4.9 cu.in/rev (40 to 80 cc/rev)
  - twin-flow from 2x1.5 to 2x2.4 cu.in/rev (2x25 to 2x40 cc/rev)

**PAD pumps**
- Two-flow pumps, with 10 pistons, thus offering optimal flow regularity within reduced size envelope:
  - twin-flow: 2x3.36 and 2x 4.09 cu.in/rev (2x55 and 2x67 cc/rev)
<table>
<thead>
<tr>
<th>Pump reference</th>
<th>Displacement</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>J</th>
<th>K</th>
<th>Weight</th>
<th>Overhang torque</th>
<th>Max. speed</th>
<th>Max. torque absorbed at 5800 psi (400 bar)</th>
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</tbody>
</table>

(1) Maximum torque given with a mechanical efficiency at 90%.
(2) Maximum torque for the two pressure ports at 5800 psi (400 bar).

Dimensions in inches (mm).
**Performance - PA | PAC | PAD**

▶ Torque absorbed as a function of pump output pressure (with a mechanical efficiency considered at 90%)

### Single flow models

- **PA series**
  - Single flow models PA
  - Single flow models PAC

### Twin-flow models

- **PA series**
  - Twin flow models PA
  - Twin flow models PAC
  - Twin flow models PAD

### Calculation of power to be supplied to the shaft as a function of flow and pressure

\[ P = \frac{\Delta P \times Q}{600 \times \eta_{\text{global}}} \]

**Calculation of torque to determine PTO, as a function of the displacement and the pressure**

\[ C = \frac{\text{Cyl} \times \Delta P}{62.8 \times \eta_{\text{meca}}} \]

- **P** = Hydraulic power in kW
- **Q** = Flow in l/min
- **\( \eta_{\text{global}} \)** = Volumetric efficiency + mechanical efficiency
- **C** = Torque in N.m
- **Cyl** = Displacement in cu.in/rev
- **\( \Delta P \)** = Differential pressure at the pump terminals, in bar
- **\( \eta_{\text{meca}} \)** = Mechanical efficiency
Flow as a function of rotating speed

Single flow models

Twin-flow models

Calculation of the flow:

\[ Q = \frac{\text{Cyl} \times N \times \eta_{\text{vol}}}{1000} \]

\( Q \) = Flow in l/min
\( \text{Cyl} \) = Displacement in cu.in/rev
\( N \) = Speed in rpm
\( \eta_{\text{vol}} \) = Volumetric efficiency

Volumetric efficiency

These graphs are the results of testwork done in HYDRO LEDUC R&D laboratory, on a specific test bench with a mineral hydraulic fluid ISO VG46 at 77°F (25°C) (~100 cSt) - disregarding the volumetric efficiency.
INLET FITTINGS FOR PA | PAC | PAD PUMPS

See recommendations of the hosing dimensions on page 42.
For high speeds, please consult.

90° elbow fittings, swivel

<table>
<thead>
<tr>
<th>Reference</th>
<th>Ø A</th>
<th>Ø B</th>
<th>C</th>
<th>D</th>
<th>E</th>
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Dimensions in inches (mm).

Straight fittings

<table>
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<th>C</th>
<th>D</th>
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Dimensions in inches (mm).

DEFLECTOR TO PROTECT SHAFT SEALS

This deflector ensures the protection of the pump shaft seals.
In particular, it protects the pump from projections of dirt from the road in cardan drive installations.

Reference: DEF 054111

CARDAN PLATE- DIN 90 and DIN 100

The cardan plate enables the pump shaft to be connected to a cardan shaft with interface as on drawing on the right.
Note: the maximum admissible torque is limited by the drive shaft.

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<th>Type</th>
<th>LEDUC code</th>
<th>ØA</th>
<th>ØB</th>
<th>C</th>
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<th>E</th>
<th>F</th>
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Dimensions in inches (mm).