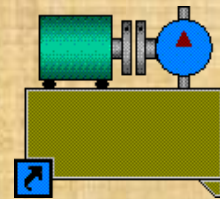


# CompuDraulic

Hydraulic Component Sizing Calculator - V03



[www.CompuDraulic.com](http://www.CompuDraulic.com)

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## Introduction

Features

Who is the beneficiary?

Pumps

Motors

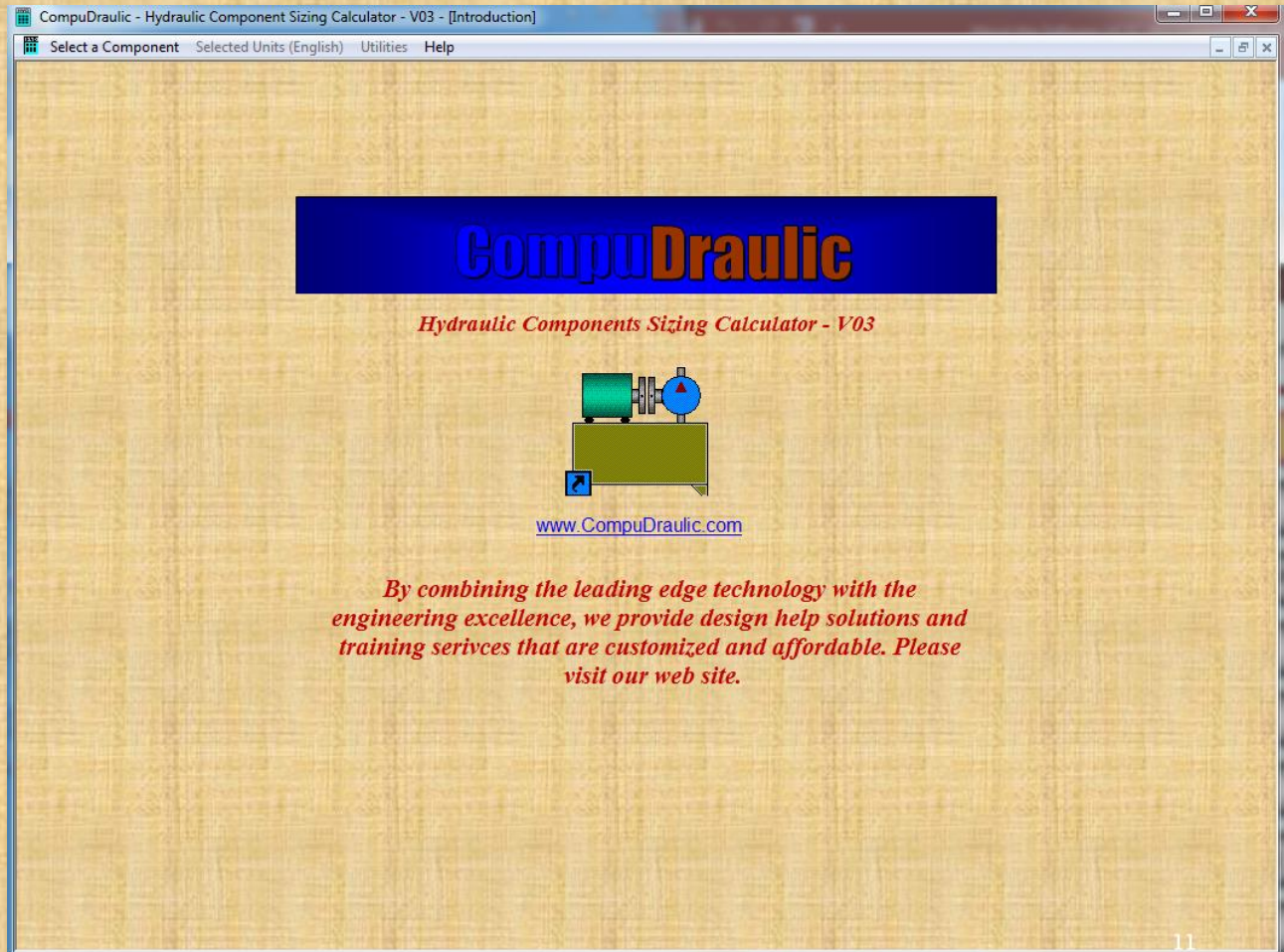
Cylinders

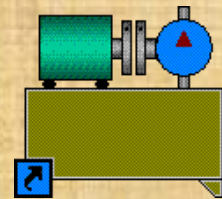
Cylinder Buckling

Accumulators

Fluid Lines

Utilities





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The screenshot shows the software interface for the 'Hydraulic Component Sizing Calculator - V02 - [Fixed Displacement Pump]'. The title bar includes standard window controls. Below the title bar is a toolbar with icons for various hydraulic components: a pump, a cylinder, a valve, a line, a reservoir, a motor, a pressure gauge, a temperature gauge, a flow meter, and a question mark. The main content area contains two sections of text, each preceded by a red underlined heading. The first section, 'What is the "Hydraulic Component Sizing Calculator"', lists three bullet points describing the tool's purpose and benefits. The second section, 'Main Features of the "Hydraulic Component Sizing Calculator"', lists seven bullet points detailing the software's capabilities, such as calculation types, user interface, report generation, unit switching, formula access, and a built-in unit converter.

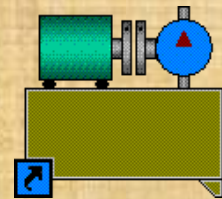
CompuDraulic - Hydraulic Component Sizing Calculator - V02 - [Fixed Displacement Pump]

What is the "Hydraulic Component Sizing Calculator"

- ❖ It is an interactive tool designed to help the hydraulic system builders to select the proper size of a hydraulic component.
- ❖ It is extremely helpful in estimating the hydraulic component size and to predict the performance of such component under specific operating conditions.
- ❖ It is the most quick, easy and cost efficient hydraulic calculator.

Main Features of the "Hydraulic Component Sizing Calculator"

- ❖ Sizing calculations for most frequently used hydraulic components.
- ❖ An easy-to-use user interface to get answers at your finger tips.
- ❖ Generate, save and print report contains your calculations results.
- ❖ Switch instantaneously between English and ISO system of units.
- ❖ Access to a printable PDF file contains all used formula, variable definition and conversion factors.
- ❖ A built-in unit convertor that eases the navigation between different units.



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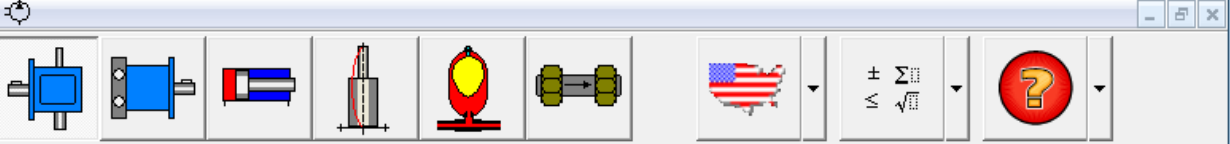
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CompuDraulic - Hydraulic Component Sizing Calculator - V02 - [Fixed Displacement Pump]




Fluid Power Distributors, Designers and System Builders:

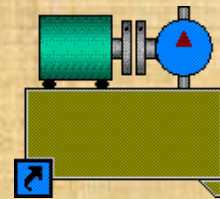
- ❖ This software has been designed to save your time, take you beyond the details of the component level and to keep your focus on the entire system design.
- ❖ This software helps you to answer the questions of your customers immediately and improve your confidence in making the right decision at the right time.

Fluid Power Instructors:

- ❖ This software can be used to validate and reinforce the understanding of the calculations associated with hydraulic system design and components selection.
- ❖ This software helps the instructor to demonstrate the effect of different design parameter and operating conditions on component performance.
- ❖ This software helps the instructor to quickly prepare exam problems.

Keep it on your desktop, it will be your best friend !.





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CompuDraulic - Hydraulic Component Sizing Calculator - V03 - [Fixed Displacement Pump]

Select a Component Selected Units (SI) Utilities Help

**Operating Conditions:**

Pump Speed [rpm] = 1500

System Pressure [bar] = 100

**Design Parameters:**

Pump Displacement [cc/rev] = 100

Hydro-Mechanical Efficiency [%] = 95

Volumetric Efficiency [%] = 98

At Pump Speed [rpm] = 1500

At system Pressure [bar] = 500

**Output Data:**

Vol. Eff. at new Operating Conditions [%] = 98

Pump Theoretical Flow Rate [L/min] = 150

Pump Actual Flow Rate [L/min] = 147

Pump Leakage Flow Rate [L/min] = 3

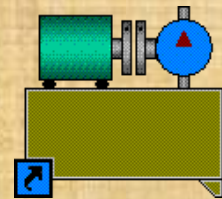
Pump Total Efficiency [%] = 93.1

Pump Output Power [kW] = 24.5

Pump Power Losses [kW] = 1.816

Drive Motor Power [kW] = 26.316

Torque on the Pump Shaft [N.m] = 167.616



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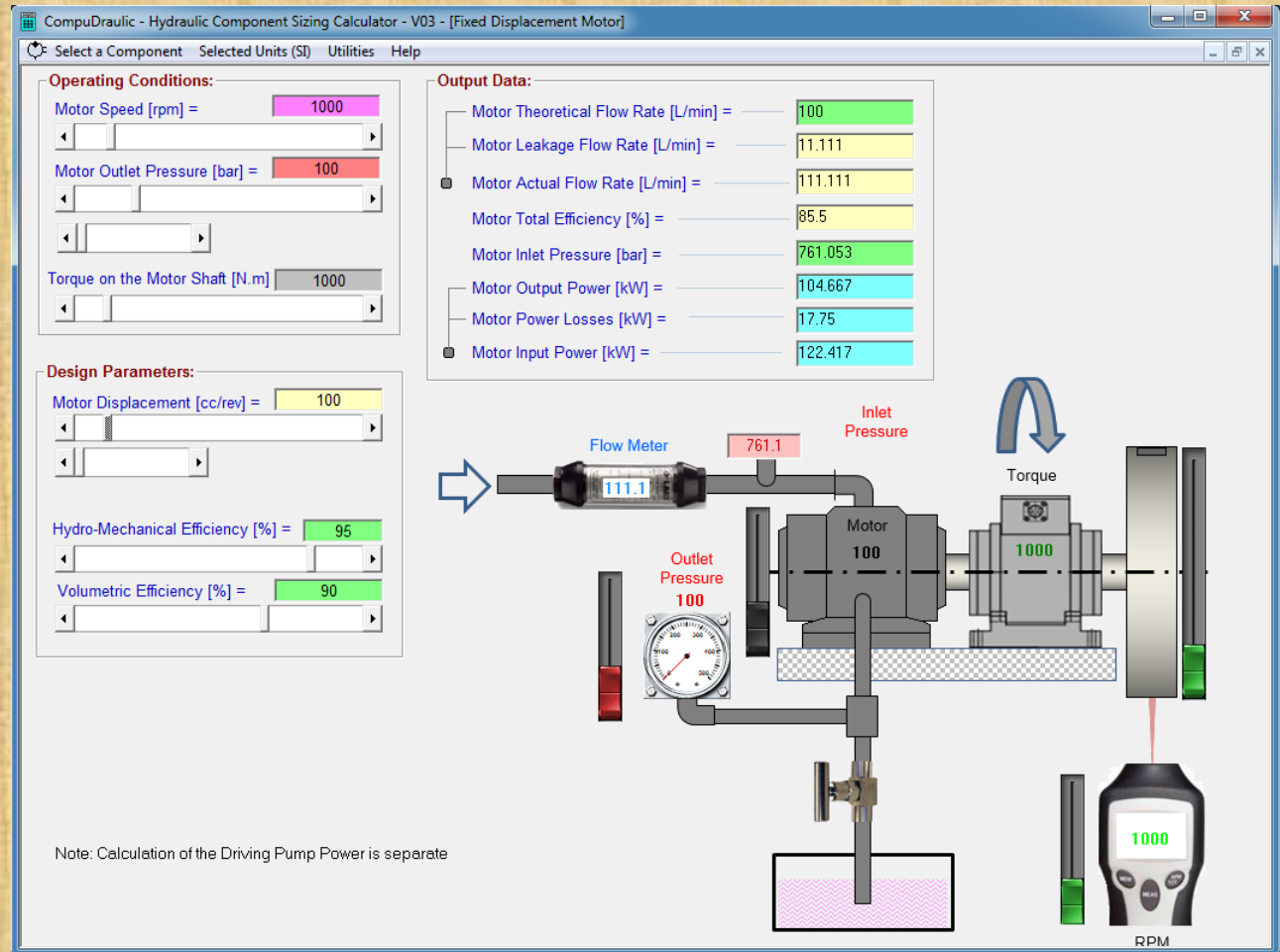
Cylinders

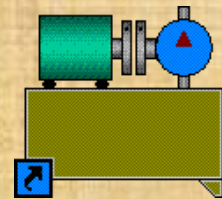
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CompuDraulic - Hydraulic Component Sizing Calculator - V03 - [Double-Acting Hydraulic Cylinder]

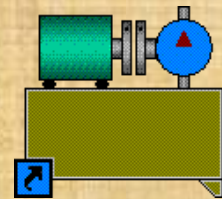
Select a Component Selected Units (SI) Utilities Help

Cylinder Dimensions	Cylinder Hydraulics	Cylinder Dynamics
Acap (cm2) 78.5	Pcap (bar) 51.73	kvt [N/(cm/s)] 10
Dcap (mm) 100		
Arod (cm2) 39.25	Prod (bar) 100.7	Fcyl [kgf] 100
Drod (mm) 70.711		
Area Ratio 2	Qcap (L/min) 48	Vcyl (cm/s) 10.191
Scyl (mm) 200	Qrod (L/min) 24	Stime (s) 1.962

**Cylinder Stroke**

☒ Extension  
☐ Retraction

The diagram illustrates a double-acting hydraulic cylinder. On the left, a circular cross-section shows the cap end with diameter Dcap and area Acap, and the rod end with diameter Drod and area Arod. The rod extends to the right. Arrows indicate flow rates: 51.73 L/min into the cap end and 24 L/min out of the rod end. The rod diameter is labeled as 70.711 mm. The cylinder stroke is labeled as 200 mm. The flow rate out of the rod end is labeled as 24 L/min.



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CompuDraulic - Hydraulic Component Sizing Calculator - V03 - [Cylinder Buckling]

Select a Component Selected Units (SI) Utilities Help

**Input Data:**

Rod Diameter [mm] = 10

Modulus of Elasticity [MPa] = 210000

Yield Strength [MPa] = 250

Safety Factor = 1

Actual Compressed Length (cm) = 100

**Output Data:**

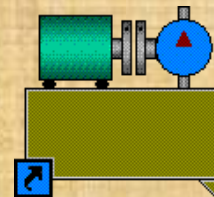
Slenderness Ratio [-] = 400

Critical Slenderness Ratio [-] = 101.748

Critical Buckling Load [Ton] = 0.104

Allowable Compressive Load [Ton] = 0.104

Fixed-Free Hinged-Hinged Fixed-Hinged Fixed-Fixed



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Select a Component   Selected Units (SI)   Utilities   Help

**Operating Conditions:**

Min System Absolute Pressure [bar] =

Max System Absolute Pressure [bar] =

Gas Thermal Process   ☐ Isothermal   ☒ Adiabatic

Adiabatic Exponent

**Accumulator Type**

☒ Piston Accumulator  
☐ Bladder Accumulator  
☐ Diaphragm Accumulator

**Design Parameters:**

Accumulator Nominal Volume [Liter - CC] =

Pump Flow Rate [L/min] =

**Output Data:**

Accumulator Pre-Charge Absolute Pressure [bar] =

Gas volume at P1 [Liter - CC] =

Gas volume at P2 [Liter - CC] =

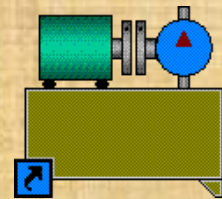
Oil Stored Volume [Liter - CC] =

Accumulator Charging Time [s] =

Accumulator Charging Power [kW] =

Compression Ratio =

**Diagram:**



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Select a Component   Selected Units (SI)   Utilities   Help

**Operating Conditions:**

Flow Rate [L/min]= 100

Fluid Viscosity [cSt]= 32

Fluid Density [kg/m3]= 850

**Design Parameters:**

Hydraulic Line Diameter [mm]= 25

Hydraulic Line Length [m]= 1

**Output Data:**

Hydraulic Line Area [cm2] = 4.906

Flow Speed [m/s] = 3.397

Reynolds Number [-] = 2653.928

Friction Coefficient [-] = 0.044

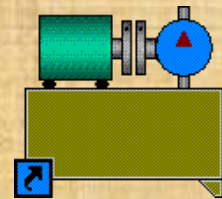
Pressure Drop [bar] = 0.086

Flow Status = Transition

Flow Rate & Fluid Properties

P1 P2 Diameter

Length P1-P2



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**Operating Conditions:**

Flow Rate [gpm] = 26.42

**Output Data:**

Hydraulic Line Area [in2] =

Flow Speed [ft/s] =

Reynolds Number [-] =

Friction Coefficient [-] =

Pressure Drop [psi] =

Flow Status =

Report Generator (Run as Administrator)

Used Formula

Unit Converter

Flow Rate & Fluid Properties

P1 P2 Diameter

Length

P1-P2

Switch between ISO and English system of units

Generate, save and print report of your calculation results

Access "Used Formula" in PDF format

Activate Unit Converter