

# Portable Pneumatics eLearning Course | Pressure, Flow, & Speed

Principles of Pneumatic Pressure and Flow - V11139-XA03XEN-E1

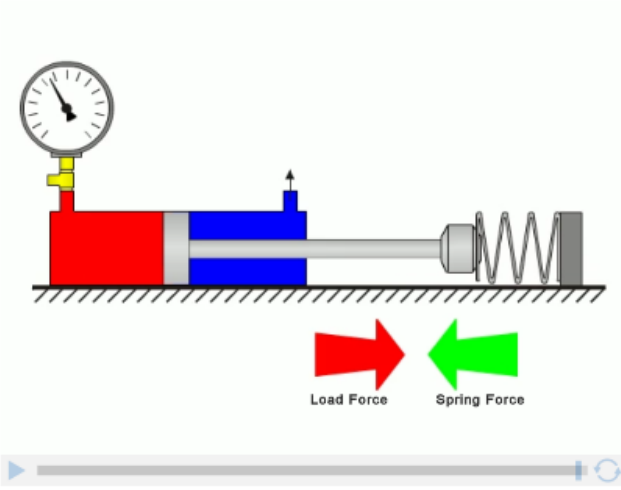
Objective 1: Describe How to Calculate the Force Output of an Extending Cylinder

Spring Rate

The actual force output of a cylinder can be measured by placing a spring against a cylinder rod to resist movement.

The spring reacts to a load by compressing to a length where the spring force balances the load force. If the pressure increases, the spring compresses further until the forces are balanced.

The force it takes to compress a spring a given distance is constant and is called the spring rate (K).



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## eLearning Course: M11139

Pneumatic power is used in everything from air brakes and hand tools to spray painters and industrial robots. Amatrol's Multimedia Courseware - Portable Pneumatics (M11139) teaches learners about essential basic and intermediate pneumatics concepts applicable across a variety of modern industries, such as manufacturing, transportation, and construction. Learners using Amatrol's portable pneumatics eLearning course begin by studying the physical principles of pneumatics, such as pressure and flow, and how pneumatic mechanisms are used in real world applications. From this building block, learners begin practicing industry-relevant pneumatic skills, like constructing pneumatic circuits.

## Teach Pneumatic Power Systems

### In-Depth, Comprehensive Basic & Intermediate Pneumatics Curriculum Connected to Real-World Skills

Amatrol's eLearning curriculum is unique in that it thoughtfully combines in-depth theoretical knowledge with practical, hands-on skills. This powerful combination of knowledge and skills solidifies understanding and creates a strong foundation for pursuing more advanced skills.

For example, the portable pneumatics eLearning course covers important topics, such as:

### Pneumatic Power Systems

Learners begin with an introduction to pneumatics, including power unit operation, circuit connections, and basic cylinder circuits. Individual lessons focus on topics like pneumatic pressure, the basic components of a pneumatic system, pneumatic schematics, and the function and operation of various types of pneumatic cylinders. Learners will also practice skills, such as reading a pneumatic pressure gauge, using a tee to connect two circuit branches together, and designing a multiple cylinder pneumatic circuit.

### Basic Pneumatic Circuits

Learners will study the components and operation of basic pneumatic circuits, including single-acting cylinder

circuits, basic motor circuits, and pneumatic schematics. Individual lessons focus on topics like 3/2 pneumatic directional control valves, air mufflers, pneumatic motors, and pneumatic circuit schematics. Learners will also practice skills, such as connecting and operating a single-acting pneumatic cylinder using a 3/2 manually-operated DCV, connecting and operating a uni-directional pneumatic motor using a 3-way, manually-operated DCV, and designing and drawing a schematic for a multiple actuator pneumatic circuit.

### **Principles of Pneumatic Pressure and Flow**

Learners using Amatrol's portable pneumatics eLearning course will study basic principles of pneumatic pressure and flow, including pressure vs. cylinder force, pneumatic leverage, pressure and volume, and air flow and resistance. Individual lessons focus on topics like the force output of extending and retracting cylinders, Pascal's Law, Boyle's Law, and resistance in a pneumatic system. Learners will also practice skills, such as calculating the retraction force of a cylinder given its size and pressure, measuring Delta P across pneumatic components, and converting between absolute pressure and gauge pressure.

### **Pneumatic Speed Control Circuits**

Learners will study various aspects and components of pneumatic speed control circuits, including: air flow control and measurement; flow control valves; and speed control. Individual lessons focus on topics like the function and operation of various types of valves, operation and applications of meter-in and meter-out flow control circuits, exhaust and pressure port speed control, and independent speed control circuits. Learners will also practice skills, such as connecting and operating a needle valve to control actuator speed, connecting and adjusting a flow control valve to control speed of an actuator, and designing an independent speed control circuit.

### **Pneumatic DCV Applications**

Learners using Amatrol's portable pneumatics eLearning course will study various aspects and components of pneumatic DCV applications, including cam valves, cam valve applications, and two-way valves. Individual lessons focus on topics like the function and operation of a pneumatic cam-operated DCV, the operation of a 2-speed pneumatic circuit using a cam valve, and the construction and operation of five types of two-way valves. Learners will also practice skills, such as connecting and operating a pneumatic cam-operated 4/2 DCV, designing a rapid traverse-slow feed pneumatic circuit, and connecting and operating a cylinder deceleration circuit using power braking.

### **Air Logic**

Learners will study various aspects and components of air logic, including externally-piloted valves, applications of air logic, and air logic design. Individual lessons focus on topics like the function and applications of an externally air-piloted DCV, the operation of an air logic cylinder sequence circuit, and the operation of a pneumatic seal-in circuit. Learners will also practice skills, such as designing a pneumatic circuit that uses an externally air-piloted DCV, connecting and operating a cam-operated sequence circuit, and connecting and operating an air logic circuit to control a reciprocating cylinder.

### **Pneumatic Maintenance**

Learners using Amatrol's portable pneumatics eLearning course will study various aspects and components of pneumatic maintenance, including air filtration, water removal, lubrication, and servicing pneumatic components. Individual lessons focus on topics like the function and applications of a coalescing filter, the operation of two types of pneumatic traps, and the operation and applications of three types of pneumatic lubricators. Learners will also practice skills, such as changing an air filter element, selecting an air filter for an application, and connecting, filling, and adjusting a lubricator.

## **Interactive eLearning**

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### **Highly-Interactive Multimedia Format Appeals to All Learning Styles**

Amatrol's portable pneumatics eLearning course curriculum features a highly-interactive multimedia format. Stunning 3D animations, videos, pictures, voiceovers of all text, and interactive quizzes and exercises bring

learning to life. Amatrol's multimedia curriculum contains elements that will appeal to every learning style, keeping learners motivated and engaged.

### **Anytime, Anywhere Access Promotes Self-Paced Learning**

In today's fast-paced, technology-driven world, it's more important than ever to extend the reach of industrial skill training beyond the borders of traditional classrooms. Amatrol's eLearning meets the challenge for flexibility by offering in-depth, comprehensive technical skills training via an intuitive, easy-to-use web-based Learning Management System (LMS).

With anytime, anywhere online access, Amatrol's eLearning allows learners to set their own pace at home, on the job, in a traditional class setting, or a blended approach of these options. Click here to learn more about [Amatrol's eLearning and LMS](#).

### **Additional Info**

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#### **Requires:**

- Computer: [See requirements](#)

#### **Options:**

- Portable Pneumatics Learning System ([990-PN1](#))

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