

# Chapter 14

## Fluid Power Systems and Components

### SUMMARY

Fluid power systems are those that transmit and control power through the use of a pressurized fluid (liquid or gas) within an enclosed circuit. Fluid power includes the technologies of hydraulics, pneumatics, and fluid logic. The world standards<sup>1</sup> presented in this chapter deal, for the most part, with hydraulic fluid power systems and components.

The National Fluid Power Association (NFPA) (see Table 1-1) administers the secretariat of the ISO TC 131 on fluid power, and a number of standards have been approved and published.

The ISO standards presented in this chapter conform, with some exceptions, to the national standards and industry practices in all major industrial countries.

<sup>1</sup>For information about the term “standard” as used in this book, please see p. 12.

### NOMINAL PRESSURES

The recommended SI units for hydraulic pressure is the pascal (1 Pa = 1 N/mm<sup>2</sup>). The bar was widely used throughout Europe and 1 MPa equals 10 bar and 1 kPa equals 10 mbar (millibar). To bring practical units for volumetric flow in line with theoretical calculations, the cubic meter per second (m<sup>3</sup>/s) or liter per second (L/s) is recommended for use instead of the cubic meter and liter per minute (simplifications of power calculations).

ISO 2944 recommended pressures for fluid power are shown in Table 14-1.

**TABLE 14-1 NOMINAL PRESSURES-GAGE PRESSURES IN kPa AND MPa<sup>1</sup> (ISO 2944)**

kPa (kilopascal)			MPa (megapascal)		
1	10	100	1	10	100
(1.25)	(12.5)	(125)	(1.25)	(12.5)	
1.6	16	160	1.6	16	
(2)	(20)	(200)	(2)	20	
2.5	25	250	2.5	25	
(3.15)	(31.5)	(315)	(3.15)	31.5	
4	40	400	4	40	
(5)	(50)	(500)	(5)	50	
6.3	63	630	6.3	63	
(8)	(80)	(800)	(8)	80	

NOTES:

1. Non-preferred values are in parenthesis.
2. 1 kPa (kilopascal) = 10 mbar = 0.145 psi.
3. 1 MPa (megapascal) = 145 psi.