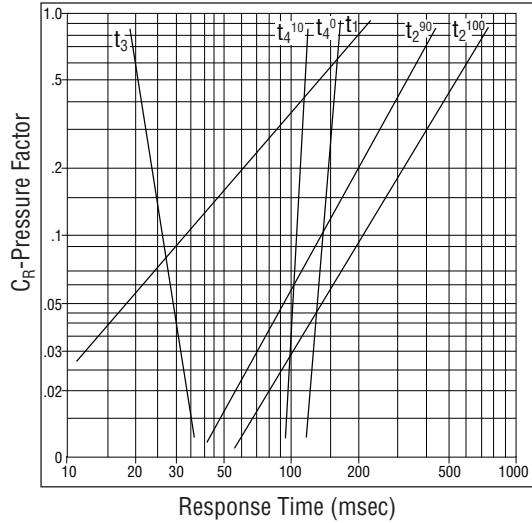# nexen.

◗ **RESPONSE TIME DATA** For Clutches and Brakes using "Air Champ®" Valves

All data obtained by using 8 inch long 1/4 inch diameter hose, 1/8 inch NPT fittings and quick exhaust valves.

t_v = Valve delay time
tv = 5 msec for .062, 3 way valve
tv = 8 msec for 4 way valve, pilot operated
tv = 70 msec for 4 way valve, spring operated

t_1 = Time from start of valve open to start of torque rise

$t_2{}^{90}$ = Time from start of torque rise to 90% value of torque

$t_2{}^{100}$ = Time from start of torque rise to 100% value or torque

t^3 = Time from start of valve exhaust to start of torque decay

$t_4{}^{10}$ = Time from start of torque decay to 10% valve of torque

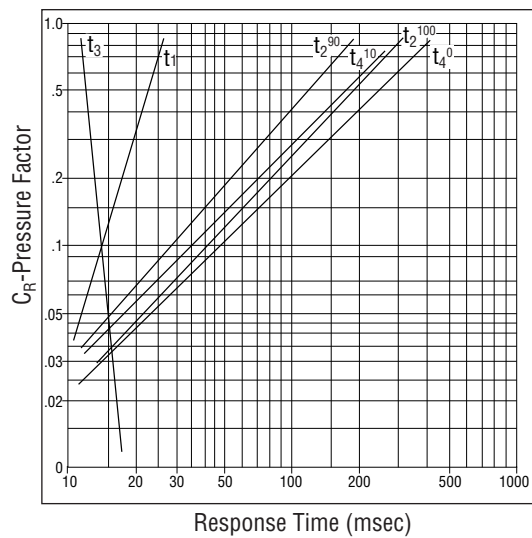$t_4{}^0$ = Time from start of torque decay to 0% value of torque

Obtain CR values for units from table page 365 and 366. Read times at 100 PSIG directly from CR vs Response Time graphs below

◗ **3-WAY VALVE RESPONSE TIMES**

C$_R$-Pressure Factor vs Response Time (msec)

◗ **4-WAY VALVE RESPONSE TIMES**

C$_R$-Pressure Factor vs Response Time (msec)
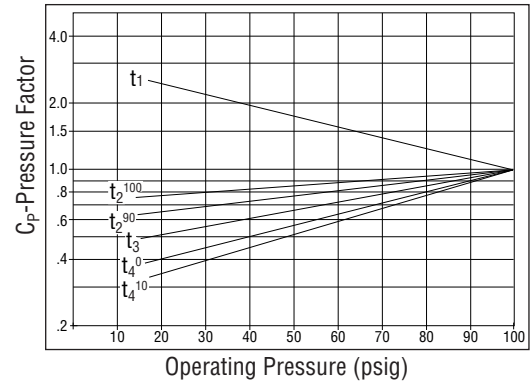
Correction factor for operating pressures less than 100 PSIG Use formula $t_p = C_p (t)_{100}$

t_p = Response time at pressure P
C_p = Response pressure factor at pressure P from graph.
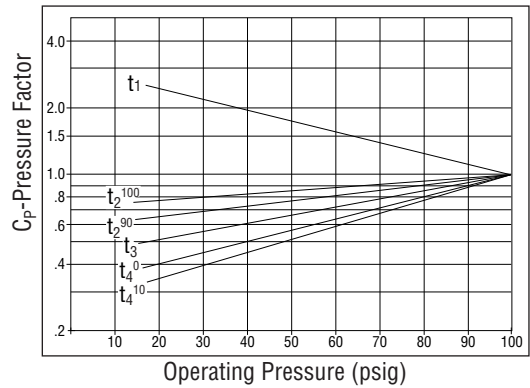t_{100} = Response time at 100 PSIG

Correction factor for hose lengths greater than 8 inches (1-10 FT) Multiply all response times by C_L where $C_L = \dfrac{t_1 + .7 (L - .66)}{t_1}$

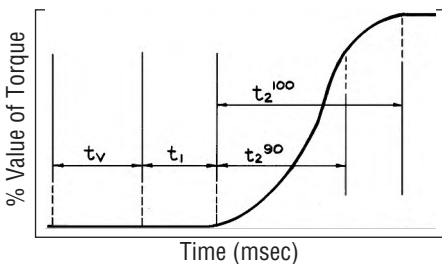t_1 Found below at operating pressure
L Length of hose in feet

◗ **3-WAY CORRECTION FACTOR GRAPH**

C$_P$-Pressure Factor vs Operating Pressure (psig)

◗ **4-WAY CORRECTION FACTOR GRAPH**

C$_P$-Pressure Factor vs Operating Pressure (psig)

◗ **TORQUE RISE RESPONSE**

% Value of Torque vs Time (msec)

◗ **TORQUE DECAY RESPONSE**

% Value of Torque vs Time (msec)

EXAMPLE: Determine the various response times defined for a 625 Modular Brake operating at 75 PSIG using a Nexen 4-way valve.

SOLUTION: I. Determine the response times at 100 PSIG.

1.) Obtain the response factor, C_R, from the Clutch and Brake Data Table page 365 and 366 C_R = .096.

2.) Read the response times at 100 PSIG directly off the 4-way C_R vs. Response Time graph; t_1 = 14 msec, $t_2{}^{90}$ = 27 msec, t_3 = 14 msec, $t_4{}^{10}$ = 34 msec, $t_4{}^0$ = 46 msec.

II. Correct the response times for 75 PSIG.

1.) Obtain the C_p factor from the 4-way Correction Factor Graph.

2.) Calculate the corrected response times using the formula $(t)_{75} = C_P (t)_{100}$.

i.e. $(t_1)_{75}$ = (1.25) (14 msec) = 17.5 msec
$(t_2{}^{90})_{75}$ = (1.08) (27 msec) = 29.2 msec

likewise the following are obtained: $(t_2{}^{100})_{75}$ = 46 msec, $(t_3)_{75}$ = 13.3 msec
$(t_4{}^{10})_{75}$ = 24 msec, $(t_4{}^0)_{75}$ = 36.8 msec