

To size an **Air to Oil** booster, Boyle's Law need not be taken into account because oil is considered an incompressible fluid. Consult Fabco-Air Engineering for fluid compatibility with standard internally lubricated Buna-N seals or optional Viton seals.

EXAMPLE 4: One shot cycle, Air to Oil Booster

Application shown: 2 cylinders, 1-5/8" bore x 4" stroke must extend to full stroke at 145 psi, then retract at system (80 psi) pressure.

Solution: $Power = \frac{Required\ Pressure\ psig}{Available\ Pressure\ psig} = \frac{145}{80}$
 $= 1.8$ Minimum Required **Power Factor**

Choose either: 2-1/2" Bore – 2 Stage
or 4" Bore – 2 Stage (See Sizing Guide on page 6.2)

Solution: Volume of Booster = Displacement of Cylinders + Margin

Displacement = Area of Bore x Stroke x Quantity of Cylinders

Margin = 25% Recommended to allow for losses and make-up fluid

Booster Volume = [2.07 (area of 1-5/8" bore) x 4" (stroke) x 2 (quantity)]
x 125% (margin)
= [16.6] x 1.25 = 20.8 cu. in.

Solution (2-1/2" Bore): $Stroke = \frac{Required\ Volume}{Volume\ per\ Inch\ Stroke^\ddagger} = \frac{20.8}{4.9^\ddagger} = 4.3$ in.

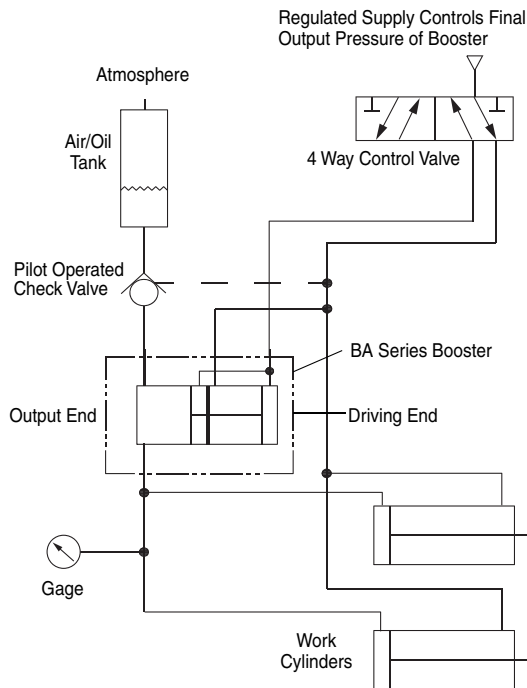
† For 2-1/2" Bore, Volume per Inch of Stroke = 4.9 (See Sizing Guide on page 6.2)

Model Choice: BA2-1/2 X 5 X 2

Alternate Solution (4" Bore): $Stroke = \frac{Required\ Volume}{Volume\ per\ Inch\ Stroke^\ddagger} = \frac{20.8}{12.6^\ddagger} = 1.7$ in.

† For 4" Bore, Volume per Inch of Stroke = 12.6 (See Sizing Guide on page 6.2)

Model Choice: BA4 X 2 X 2



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EXAMPLE 5: Pump cycle, Air to Oil Booster

Required output = 1000 cu. in./min. @ 250 psi

Available air pressure = 70 psi

Solution: $Power = \frac{Required\ Pressure\ psig}{Available\ Pressure\ psig} = \frac{250}{70}$
 $= 3.6$ Minimum Required **Power Factor**

Choose either: 2-1/2" Bore – 4 Stage
or 4" Bore – 4 Stage (See Sizing Guide on page 6.2)

Solution (2-1/2" Bore): $Stroke = \frac{Required\ Volume/Min}{Volume\ per\ Inch\ Stroke^\ddagger \times CPM} = \frac{1000}{4.9^\ddagger \times 20} = 10.2$ in.

† For 2-1/2" Bore, Volume per Inch of Stroke = 4.9 (See Sizing Guide on page 6.2)

CPM = 20 (Typical average for Fabco-Air Air to Oil Booster)

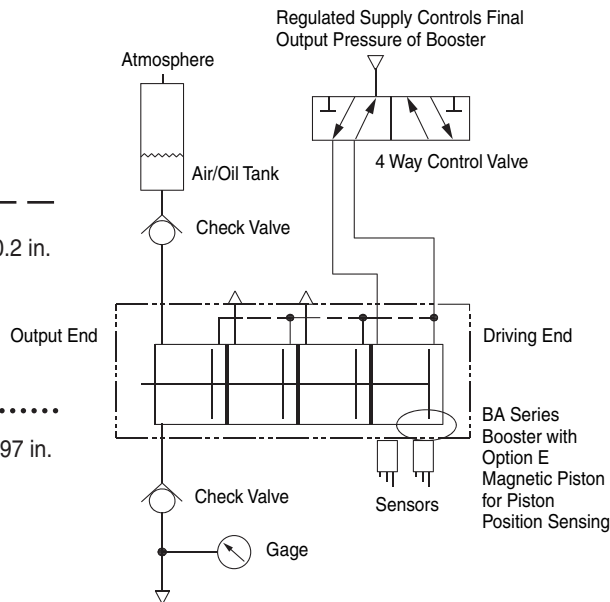
Model Choice: BA2-1/2 X 11 X 4

Alternate Solution (4" Bore): $Stroke = \frac{Required\ Volume/Min}{Volume\ per\ Inch\ Stroke^\ddagger \times CPM} = \frac{1000}{12.6^\ddagger \times 20} = 3.97$ in.

† For 4" Bore, Volume per Inch of Stroke = 12.6 (See Sizing Guide on page 6.2)

CPM = 20 (Typical average for Fabco-Air Air to Oil Booster)

Model Choice: BA4 X 4 X 4



Input Air Usage, Pump Cycle (See Example 5 above; Model BA 2-1/2 X 11 X 4, 20 stroke/min. @ 70 psi)

Solution: $Pressure = \frac{Required\ Final\ Pressure}{Booster\ Power\ Factor} = \frac{250}{3.7} = 67.6$ psi regulated input required

Solution: $Volume\ (CFM) = [Input\ Volume\ per\ Inch\ Stroke + Reset\ Volume\ per\ Inch\ Stroke] \times \frac{Stroke \times CPM}{1728\ cu.in. / cu.ft.}$

Input Volume per Inch Stroke = 19.3; Reset Volume per Inch Stroke = 4.5 (See Sizing Guide on page 6.2)

Stroke = 11 CPM = 20

$Volume = [19.3 + 4.5] \times \frac{11 \times 20}{1728} = 23.8 \times 0.127 = 3.03$ CFM @ 67.6 psi

Converting Volume to SCFM: $= \frac{CFM \times psia}{Atmosphere} = \frac{3.03 \times (67.6 + 14.7)}{14.7} = 17.0$ SCFM required