# PUMPS

A. Types

1. Inline

   Small circulation

2. End Suction

   a. Horizontal

   b. Vertical

   c. Close couple

   d. Base mount

3. Double suction
   a. Horizontal split case

   b. Vertical split case

B. Pump Curves - B & G

1. Head

2. GPM

3. NPSH

4. Pump Speed

5. System Curve

6. VFD on Pumps

C. Pump Laws

$$GPM_2 = GPM_1\left(\frac{RPM_2}{RPM_1}\right)$$

$$FT_2 = FT_1\left(\frac{RPM_2}{RPM_1}\right)^2 \qquad GPM_2 = GPM_1\left(\frac{Ft_2}{Ft_1}\right)^2$$

$$BHP_2 = BHP_1\left(\frac{GPM_2}{GPM_1}\right)^3$$

$$GPM_2 = GPM_1\left(\frac{DIA_2}{DIA_1}\right)$$

D. Sewage Ejectors

1. 2" solid

2. 3" solid

E. Sump Pumps

F. Positive Displacement

1. Chemical injectors

2. Fuel oil

G. Magnetic Drive - DI Water

H. Pneumatic Pump

I. Specifications - 15160

J. Schedules

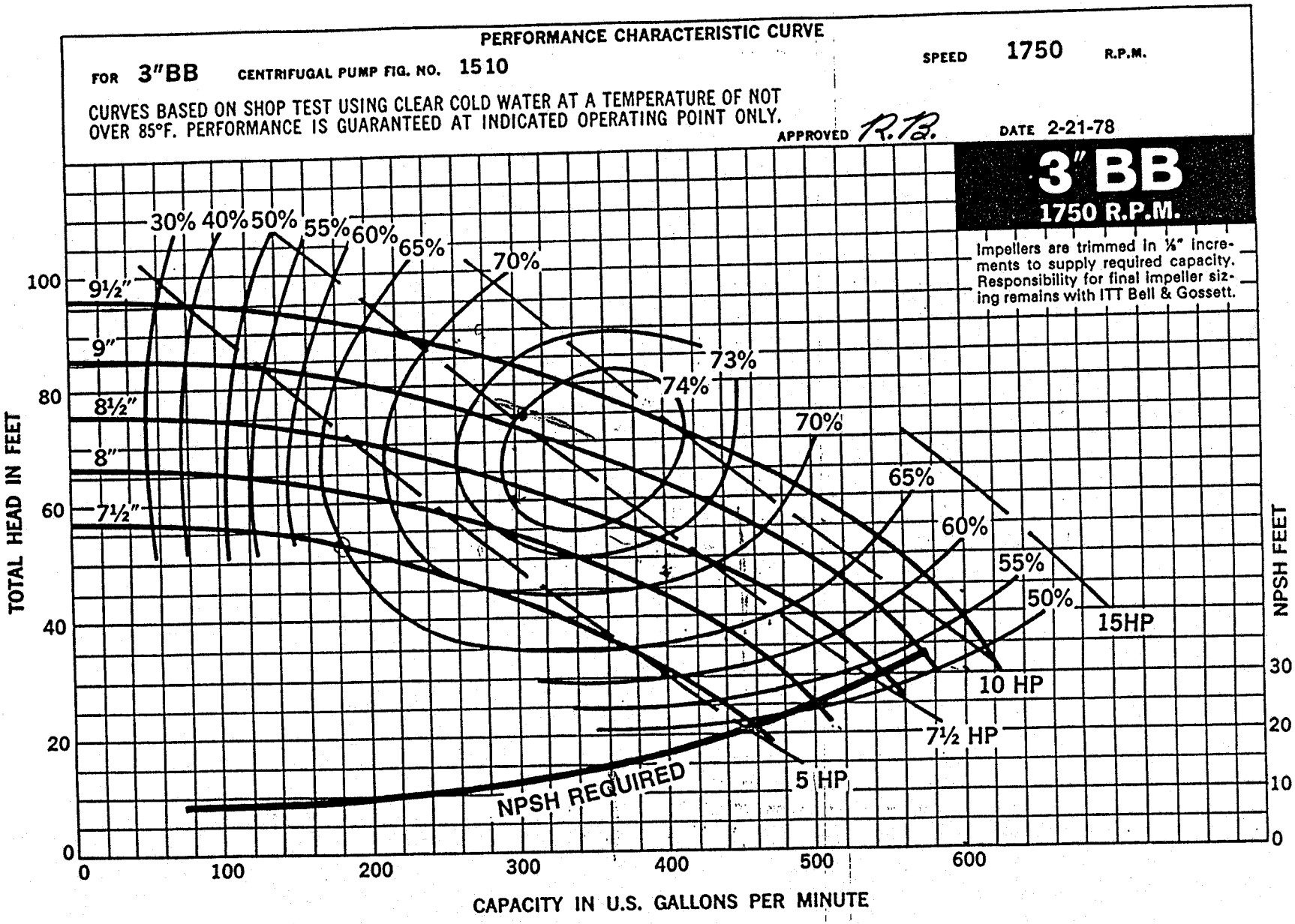
Note: Manufacturers
High Efficiency Motors

PERFORMANCE CHARACTERISTIC CURVE

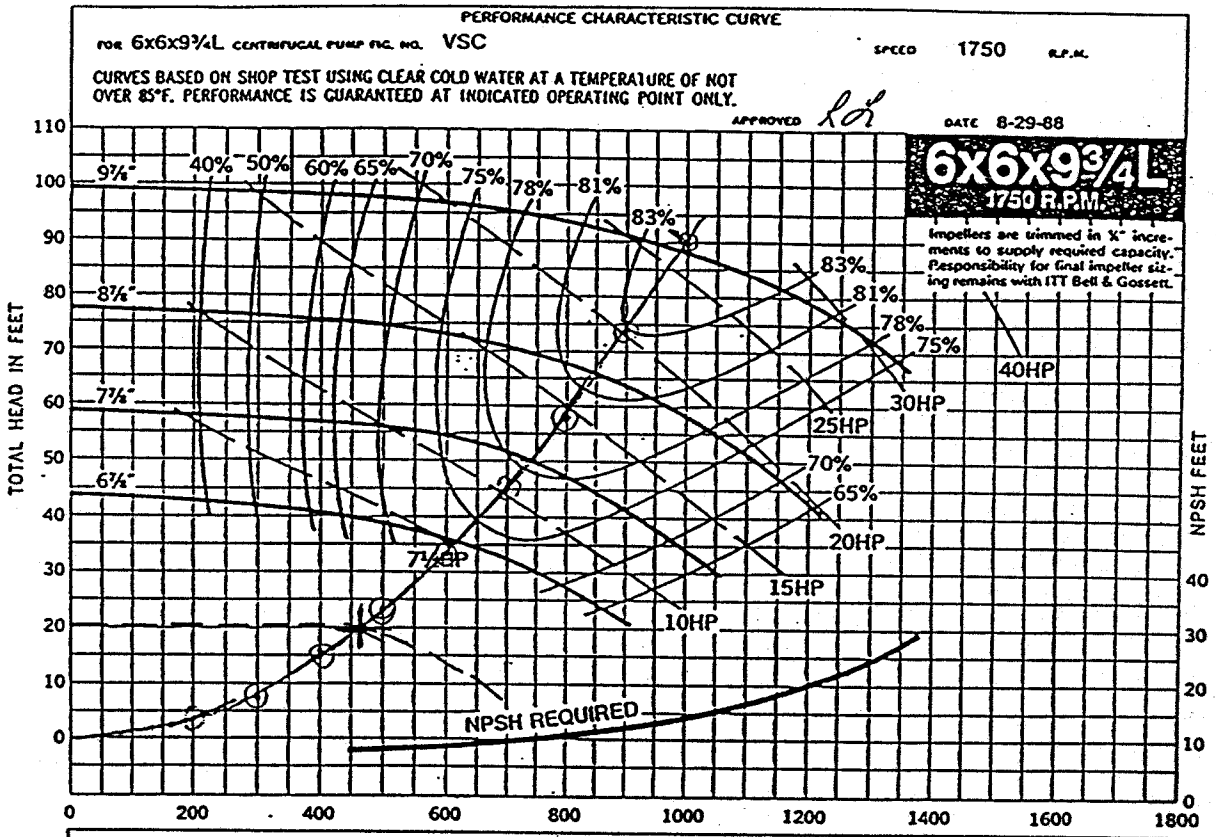
FOR 3"BB CENTRIFUGAL PUMP FIG. NO. 1510 SPEED 1750 R.P.M.

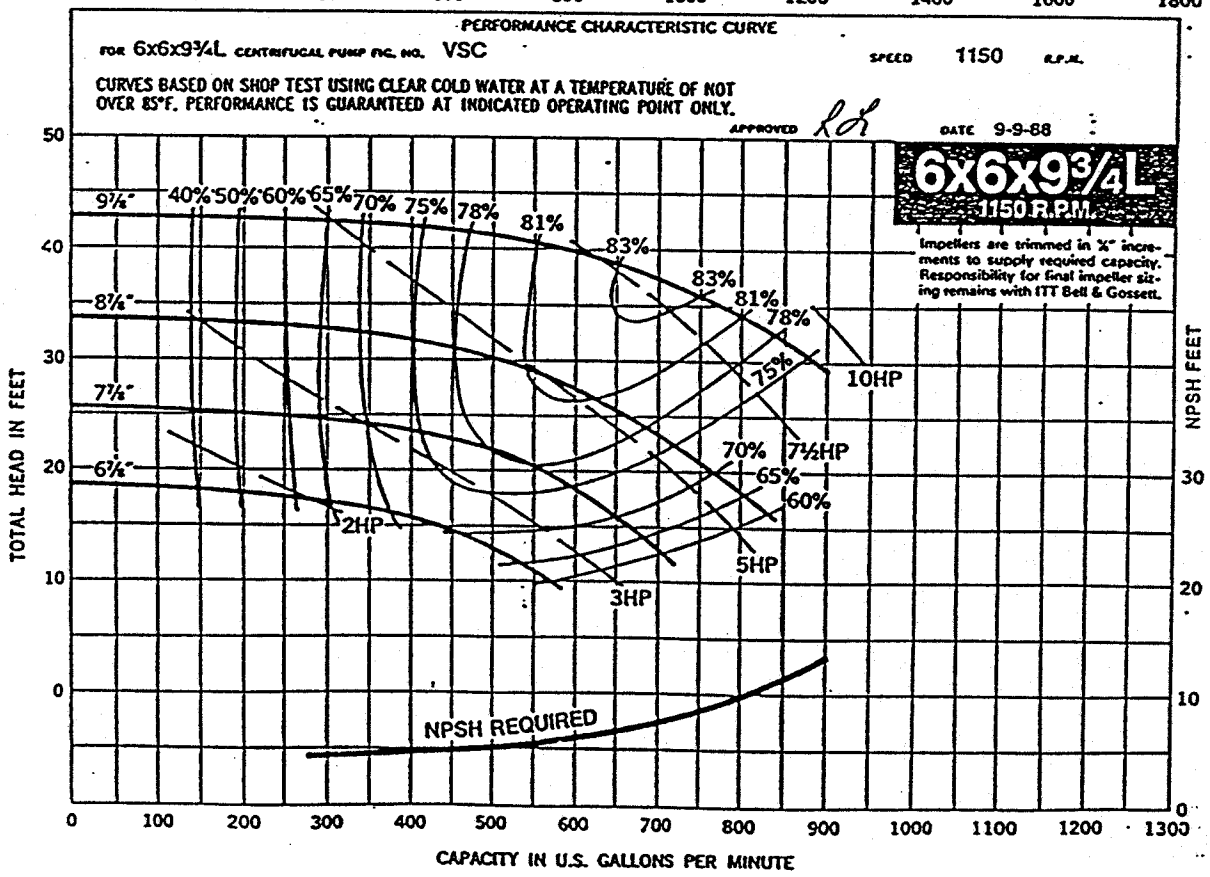
CURVES BASED ON SHOP TEST USING CLEAR COLD WATER AT A TEMPERATURE OF NOT OVER 85°F. PERFORMANCE IS GUARANTEED AT INDICATED OPERATING POINT ONLY.

APPROVED R.B. DATE 2-21-78

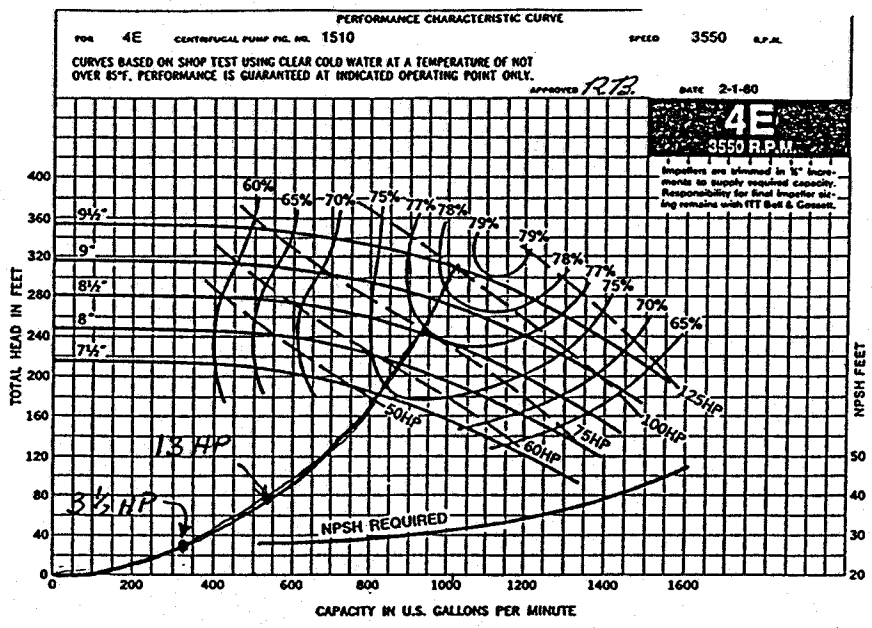


# VSC CENTRIFUGAL PUMP PERFORMANCE CURVES

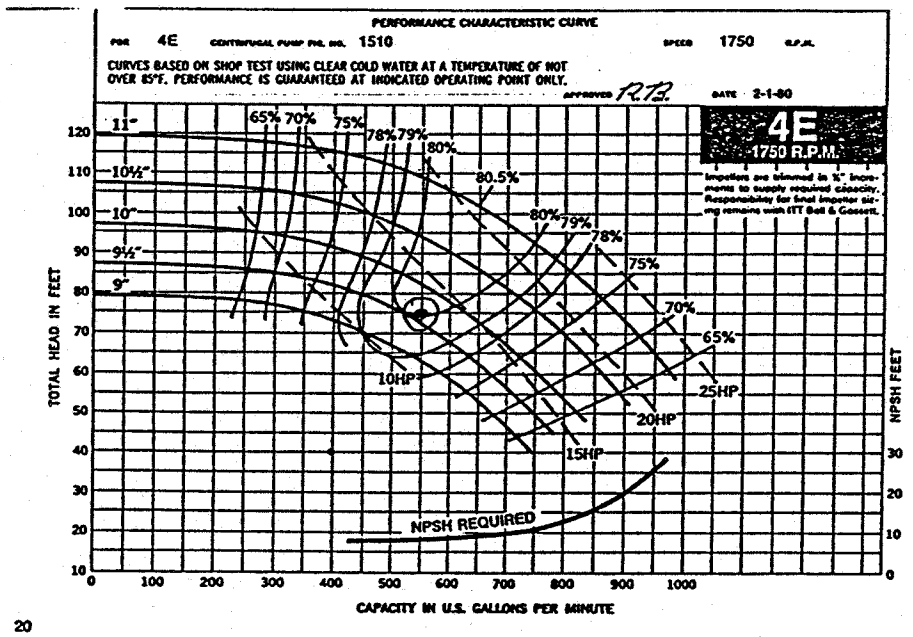


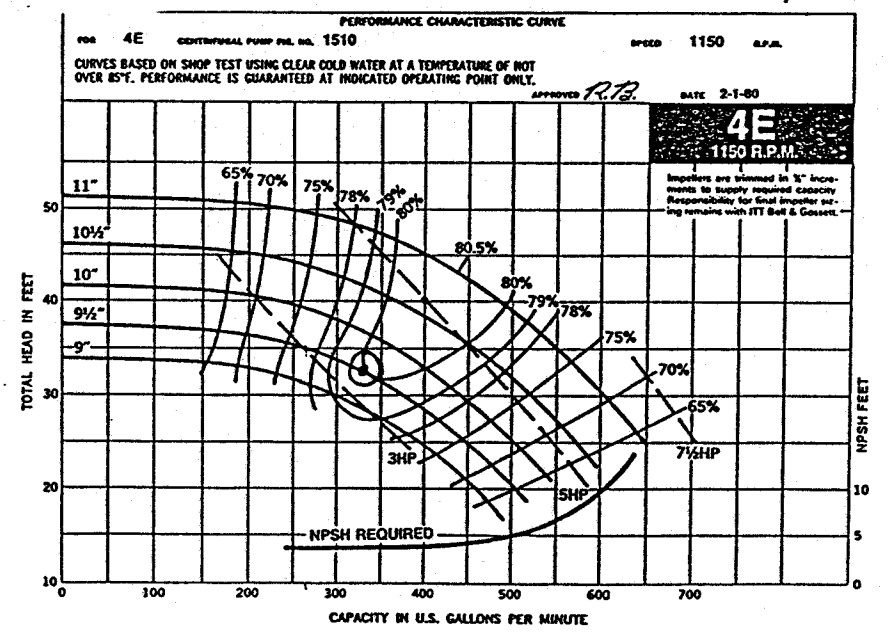

For further information, contact ITT Bell & Gossett, 8200 N. Austin Avenue, Morton Grove, IL 60053, Phone: (312) 966-3700 — Telex 4949943 — Facsimile (312) 966-9052.


PERFORMANCE CHARACTERISTIC CURVE
FOR 4E CENTRIFUGAL PUMP FIG. NO. 1510 SPEED 3550 R.P.M.
CURVES BASED ON SHOP TEST USING CLEAR COLD WATER AT A TEMPERATURE OF NOT OVER 85°F. PERFORMANCE IS GUARANTEED AT INDICATED OPERATING POINT ONLY.
APPROVED R.T.B. DATE 2-1-80
4E
3550 R.P.M.
Impellers are trimmed in ¼" increments to supply required capacity. Responsibility for final impeller sizing remains with ITT Bell & Gossett.
TOTAL HEAD IN FEET
NPSH FEET
CAPACITY IN U.S. GALLONS PER MINUTE
9½"
9"
8½"
8"
7½"
60%
65%
70%
75%
77%
78%
79%
50HP
60HP
75HP
100HP
125HP
13 HP
3½ HP
NPSH REQUIRED

11


PERFORMANCE CHARACTERISTIC CURVE
FOR 4E CENTRIFUGAL PUMP FIG. NO. 1510 SPEED 1750 R.P.M.
CURVES BASED ON SHOP TEST USING CLEAR COLD WATER AT A TEMPERATURE OF NOT OVER 85°F. PERFORMANCE IS GUARANTEED AT INDICATED OPERATING POINT ONLY.
APPROVED R.T.B. DATE 2-1-80
4E
1750 R.P.M.
Impellers are trimmed in ¼" increments to supply required capacity. Responsibility for final impeller sizing remains with ITT Bell & Gossett.
TOTAL HEAD IN FEET
NPSH FEET
CAPACITY IN U.S. GALLONS PER MINUTE
11"
10½"
10"
9½"
9"
65%
70%
75%
78%
79%
80%
80.5%
10HP
15HP
20HP
25HP
NPSH REQUIRED

20

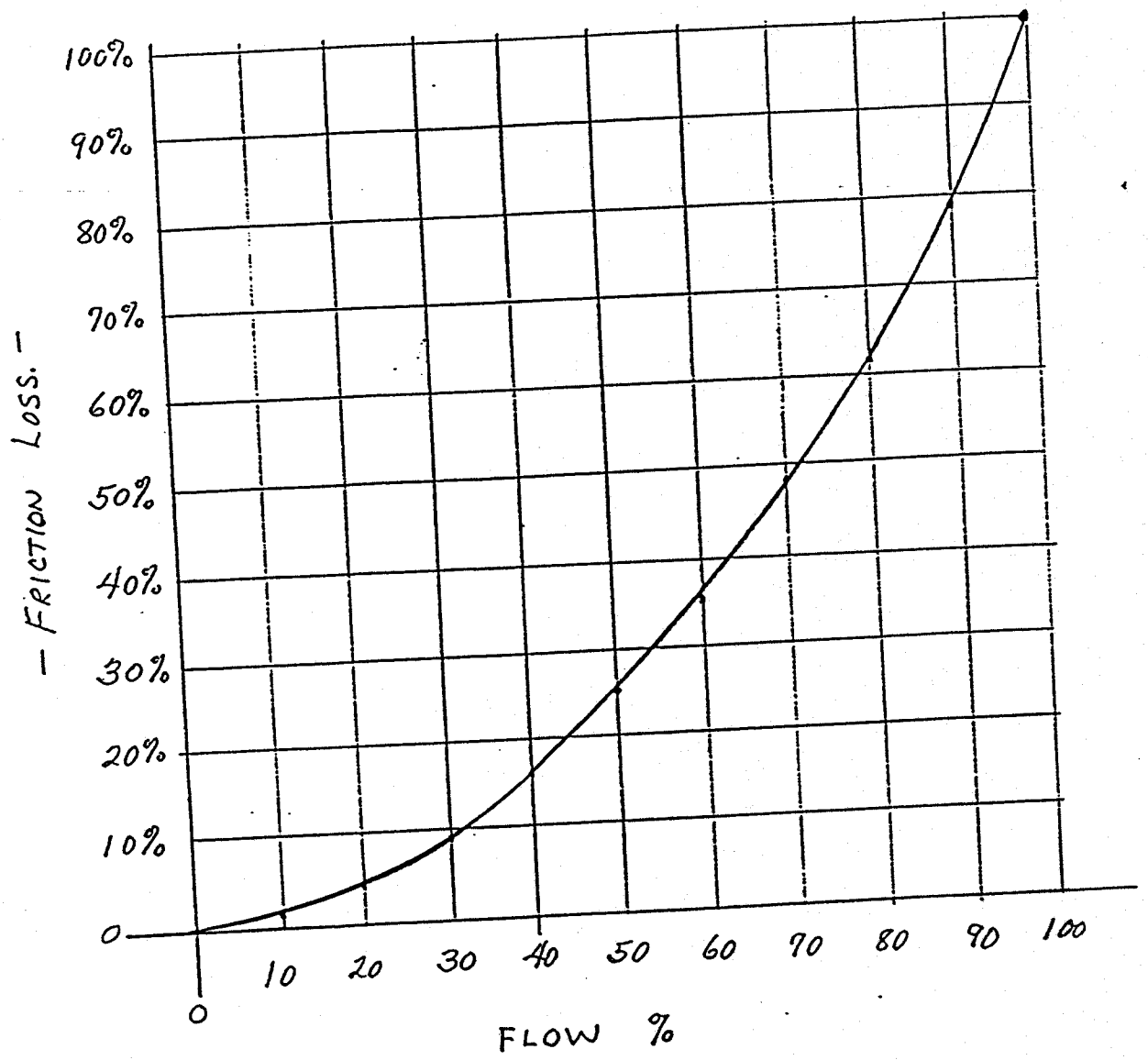

PERFORMANCE CHARACTERISTIC CURVE
FOR 4E CENTRIFUGAL PUMP FIG. NO. 1510 SPEED 1150 R.P.M.
CURVES BASED ON SHOP TEST USING CLEAR COLD WATER AT A TEMPERATURE OF NOT OVER 85°F. PERFORMANCE IS GUARANTEED AT INDICATED OPERATING POINT ONLY.
APPROVED R.T.B. DATE 2-1-80
4E
1150 R.P.M.
Impellers are trimmed in ¼" increments to supply required capacity. Responsibility for final impeller sizing remains with ITT Bell & Gossett.
TOTAL HEAD IN FEET
NPSH FEET
CAPACITY IN U.S. GALLONS PER MINUTE
11"
10½"
10"
9½"
9"
65%
70%
75%
78%
79%
80%
80.5%
3HP
5HP
7½HP
NPSH REQUIRED

33

KJW ENGINEERING CONSULTANTS

| PROJECT | DATE | BY | PROJECT NO. |
|---|---|---|---|
| TYPICAL SYSTEM FLOW | 7-16-91 | SCW | |

## FRICTION LOSS IN SYSTEMS




PRESSURE LOSS VS FLOW.

DIAGRAM C