

## Ariel Performance



Company: Collicutt Energy Services

Customer: BP Canada



Quote:

Inquiry: 05-25

7.5.5 Case 1:

Project: FH587

### Compressor Data:

|                  |               |                   |        |                   |              |
|------------------|---------------|-------------------|--------|-------------------|--------------|
| Elevation, ft:   | <u>4921.3</u> | Barmtr, kPaa:     | 84.389 | Ambient, °C:      | <u>38.00</u> |
| Frame:           | JGA/4         | Stroke, in:       | 3.00   | Rod Dia, in:      | 1.125        |
| Max RL Tot, lbf: | 20000         | Max RL Tens, lbf: | 10000  | Max RL Comp, lbf: | 11000        |
| Rated RPM:       | 1800          | Rated BHP:        | 560.0  | Rated PS FPM:     | 900.0        |
| Calc RPM:        | 1800.0        | Calc BHP:         | 191    | Calc PS FPM:      | 900.0        |

### Driver Data:

|        |           |
|--------|-----------|
| Type:  | Nat. Gas  |
| Mfg:   | Waukesha  |
| Model: | F18GL/GLD |
| BHP:   | 400       |
| Avail: | 375 (25)  |

### Services

#### Stage Data:

|                       | Service 1<br>#1 |     | #2      |     |
|-----------------------|-----------------|-----|---------|-----|
| Flow Req'd, E3m3/D    | 75.000          | --- | 75.000  | --- |
| Flow Calc, E3m3/D     | 37.103          | --- | 37.103  | --- |
| Cyl BHP per Stage     | 84.3            | --- | 94.8    | --- |
| Specific Gravity      | 0.7058          | --- | 0.7058  | --- |
| Ratio of Sp Ht (N)    | 1.2451          | --- | 1.2462  | --- |
| Comp Suct (Zs)        | 0.9768          | --- | 0.9475  | --- |
| Comp Disch (Zd)       | 0.9675          | --- | 0.9389  | --- |
| Pres Suct Line, kPag  | 600.00          | --- | N/A     | --- |
| Pres Suct Flg, kPag   | 593.16          | --- | 1917.74 | --- |
| Pres Disch Flg, kPag  | 1960.41         | --- | 6568.95 | --- |
| Pres Disch Line, kPag | N/A             | --- | 6500.00 | --- |
| Pres Ratio F/F        | 3.018           | --- | 3.323   | --- |
| Temp Suct, °C         | 25.00           | --- | 48.89   | --- |
| Temp Clr Disch, °C    | 48.89           | --- | 43.33   | --- |

#### Cylinder Data:

|                        | Throw 2    | Throw 4    | Throw 1    | Throw 3    |
|------------------------|------------|------------|------------|------------|
| Cyl Model              | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
| Cyl Bore, in           | 4.750      | 4.750      | 3.000      | 3.000      |
| Cyl RDP (API), kPag    | 5421.8     | 5421.8     | 15983.3    | 15983.3    |
| Cyl MAWP, kPag         | 5964.0     | 5964.0     | 17581.6    | 17581.6    |
| Cyl Action             | DBL        | DBL        | DBL        | DBL        |
| Disp, CFM              | 107.6      | 107.6      | 41.1       | 41.1       |
| Pres Suct Intl, kPag   | 560.25     | 560.25     | 1839.86    | 1839.86    |
| Temp Suct Intl, °C     | 27         | 27         | 51         | 51         |
| Suct Zsph              | 0.9774     | 0.9774     | 0.9488     | 0.9488     |
| Pres Disch Intl, kPag  | 2054.11    | 2054.11    | 6801.48    | 6801.48    |
| Temp Disch Intl, °C    | 107        | 107        | 144        | 144        |
| HE Suct Gas Vel, FPM   | 6961       | 6961       | 6648       | 6648       |
| HE Disch Gas Vel, FPM  | 6311       | 6311       | 5931       | 5931       |
| HE Spcrs Used/Max      | 0/2        | 0/2        | 0/1        | 0/1        |
| HE Vol Pkt Avail, %    | 1.17+53.15 | 1.17+53.15 | 0.61+42.12 | 0.61+42.12 |
| Vol Pkt Used, %        | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   |
| HE Min Clr, %          | 18.77      | 18.77      | 18.29      | 18.29      |
| HE Total Clr, %        | 19.95      | 19.95      | 18.89      | 18.89      |
| CE Suct Gas Vel, FPM   | 6571       | 6571       | 5714       | 5714       |
| CE Disch Gas Vel, FPM  | 5957       | 5957       | 5097       | 5097       |
| CE Spcrs Used/Max      | 0/2        | 0/2        | 0/1        | 0/1        |
| CE Min Clr, %          | 20.36      | 20.36      | 22.17      | 22.17      |
| CE Total Clr, %        | 20.36      | 20.36      | 22.17      | 22.17      |
| Suct Vol Eff HE/CE, %  | 64.7/64.1  | 64.7/64.1  | 62.3/57.1  | 62.3/57.1  |
| Disch Event HE/CE, ms  | 5.4/6.2    | 5.4/6.2    | 5.0/5.6    | 5.0/5.6    |
| Suct Pseudo-Q HE/CE    | 5.2/4.7    | 5.2/4.7    | 4.4/3.2    | 4.4/3.2    |
| Gas Rod Ld Comp, lbf   | 3929 C     | 3929 C     | 5376 C     | 5376 C     |
| Gas Rod Ld Tens, lbf   | 3535 T     | 3535 T     | 4087 T     | 4087 T     |
| Gas Rod Ld Total, lbf  | 7464       | 7464       | 9463       | 9463       |
| Xhd Pin Deg/%RvrsI lbf | 172/86.6   | 172/86.6   | 173/52.7   | 173/52.7   |
| Flow Calc, E3m3/D      | 18.552     | 18.552     | 18.552     | 18.552     |
| Cyl BHP                | 42.1       | 42.1       | 47.4       | 47.4       |





# Ariel Performance

Company: Collicutt Energy Services  
 Quote:  
 Case 2:

Customer: BP Canada  
 Inquiry: 05-25  
 Project: FH587



### Compressor Data:

|                  |               |                   |        |                   |              |
|------------------|---------------|-------------------|--------|-------------------|--------------|
| Elevation,ft:    | <u>4921.3</u> | Barmtr,kPaa:      | 84.389 | Ambient,°C:       | <u>38.00</u> |
| Frame:           | JGA/4         | Stroke, in:       | 3.00   | Rod Dia, in:      | 1.125        |
| Max RL Tot, lbf: | 20000         | Max RL Tens, lbf: | 10000  | Max RL Comp, lbf: | 11000        |
| Rated RPM:       | 1800          | Rated BHP:        | 560.0  | Rated PS FPM:     | 900.0        |
| Calc RPM:        | 1800.0        | Calc BHP:         | 210    | Calc PS FPM:      | 900.0        |

### Driver Data:

|        |           |
|--------|-----------|
| Type:  | Nat. Gas  |
| Mfg:   | Waukesha  |
| Model: | F18GL/GLD |
| BHP:   | 400       |
| Avail: | 375 (25)  |

### Services

#### Service 1

#### Stage Data:

|                       | #1      | --- | #2      | --- |
|-----------------------|---------|-----|---------|-----|
| Flow Req'd, E3m3/D    | 75.000  | --- | 75.000  | --- |
| Flow Calc, E3m3/D     | 43.876  | --- | 43.876  | --- |
| Cyl BHP per Stage     | 95.4    | --- | 102.5   | --- |
| Specific Gravity      | 0.7058  | --- | 0.7058  | --- |
| Ratio of Sp Ht (N)    | 1.2469  | --- | 1.2488  | --- |
| Comp Suct (Zs)        | 0.9734  | --- | 0.9425  | --- |
| Comp Disch (Zd)       | 0.9635  | --- | 0.9342  | --- |
| Pres Suct Line, kPag  | 700.00  | --- | N/A     | --- |
| Pres Suct Flg, kPag   | 692.16  | --- | 2114.39 | --- |
| Pres Disch Flg, kPag  | 2160.07 | --- | 6568.95 | --- |
| Pres Disch Line, kPag | N/A     | --- | 6500.00 | --- |
| Pres Ratio F/F        | 2.890   | --- | 3.026   | --- |
| Temp Suct, °C         | 25.00   | --- | 48.89   | --- |
| Temp Clr Disch, °C    | 48.89   | --- | 43.33   | --- |

#### Cylinder Data:

#### Throw 2

#### Throw 4

#### Throw 1

#### Throw 3

|                        | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
|------------------------|------------|------------|------------|------------|
| Cyl Bore, in           | 4.750      | 4.750      | 3.000      | 3.000      |
| Cyl RDP (API), kPag    | 5421.8     | 5421.8     | 15983.3    | 15983.3    |
| Cyl MAWP, kPag         | 5964.0     | 5964.0     | 17581.6    | 17581.6    |
| Cyl Action             | DBL        | DBL        | DBL        | DBL        |
| Cyl Disp, CFM          | 107.6      | 107.6      | 41.1       | 41.1       |
| Pres Suct Intl, kPag   | 654.29     | 654.29     | 2028.35    | 2028.35    |
| Temp Suct Intl, °C     | 27         | 27         | 51         | 51         |
| Suct Zsph              | 0.9741     | 0.9741     | 0.9439     | 0.9439     |
| Pres Disch Intl, kPag  | 2264.10    | 2264.10    | 6806.64    | 6806.64    |
| Temp Disch Intl, °C    | 105        | 105        | 137        | 137        |
| HE Suct Gas Vel, FPM   | 6961       | 6961       | 6648       | 6648       |
| HE Disch Gas Vel, FPM  | 6311       | 6311       | 5931       | 5931       |
| HE Spcrrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| HE Vol Pkt Avail, %    | 1.17+53.15 | 1.17+53.15 | 0.61+42.12 | 0.61+42.12 |
| Vol Pkt Used, %        | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   |
| HE Min Clr, %          | 18.77      | 18.77      | 18.29      | 18.29      |
| HE Total Clr, %        | 19.95      | 19.95      | 18.89      | 18.89      |
| CE Suct Gas Vel, FPM   | 6571       | 6571       | 5714       | 5714       |
| CE Disch Gas Vel, FPM  | 5957       | 5957       | 5097       | 5097       |
| CE Spcrrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| CE Min Clr, %          | 20.36      | 20.36      | 22.17      | 22.17      |
| CE Total Clr, %        | 20.36      | 20.36      | 22.17      | 22.17      |
| Suct Vol Eff HE/CE, %  | 66.5/66.0  | 66.5/66.0  | 66.3/61.6  | 66.3/61.6  |
| Disch Event HE/CE, ms  | 5.6/6.4    | 5.6/6.4    | 5.5/6.0    | 5.5/6.0    |
| Suct Pseudo-Q HE/CE    | 5.2/4.7    | 5.2/4.7    | 4.4/3.2    | 4.4/3.2    |
| Gas Rod Ld Comp, lbf   | 4241 C     | 4241 C     | 5215 C     | 5215 C     |
| Gas Rod Ld Tens, lbf   | 3802 T     | 3802 T     | 3899 T     | 3899 T     |
| Gas Rod Ld Total, lbf  | 8043       | 8043       | 9114       | 9114       |
| Xhd Pin Deg/%Rvrsl lbf | 148/79.7   | 148/79.7   | 164/54.2   | 164/54.2   |
| Flow Calc, E3m3/D      | 21.938     | 21.938     | 21.938     | 21.938     |
| Cyl BHP                | 47.7       | 47.7       | 51.2       | 51.2       |



# Ariel Performance



Company: Collicutt Energy Services

Customer: BP Canada



Quote:

Inquiry: 05-25

7.5.5 Case 3:

Project: FH587

### Compressor Data:

|                  |               |                   |        |                   |              |
|------------------|---------------|-------------------|--------|-------------------|--------------|
| Elevation, ft:   | <u>4921.3</u> | Barmtr, kPaa:     | 84.389 | Ambient, °C:      | <u>38.00</u> |
| Frame:           | JGA/4         | Stroke, in:       | 3.00   | Rod Dia, in:      | 1.125        |
| Max RL Tot, lbf: | 20000         | Max RL Tens, lbf: | 10000  | Max RL Comp, lbf: | 11000        |
| Rated RPM:       | 1800          | Rated BHP:        | 560.0  | Rated PS FPM:     | 900.0        |
| Calc RPM:        | 1800.0        | Calc BHP:         | 227    | Calc PS FPM:      | 900.0        |

### Driver Data:

Type: Nat. Gas  
Mfg: Waukesha  
Model: F18GL/GLD  
BHP: 400  
Avail: 375 (25)

### Services

#### Stage Data:

|                       | <b>Service 1</b> | <b>#1</b> | <b>#2</b> | <b>---</b> |
|-----------------------|------------------|-----------|-----------|------------|
| Flow Req'd, E3m3/D    | 75.000           | ---       | 75.000    | ---        |
| Flow Calc, E3m3/D     | 50.719           | ---       | 50.719    | ---        |
| Cyl BHP per Stage     | 106.2            | ---       | 108.6     | ---        |
| Specific Gravity      | 0.7058           | ---       | 0.7058    | ---        |
| Ratio of Sp Ht (N)    | 1.2486           | ---       | 1.2513    | ---        |
| Comp Suct (Zs)        | 0.9700           | ---       | 0.9375    | ---        |
| Comp Disch (Zd)       | 0.9596           | ---       | 0.9297    | ---        |
| Pres Suct Line, kPag  | 800.00           | ---       | N/A       | ---        |
| Pres Suct Flg, kPag   | 791.16           | ---       | 2309.92   | ---        |
| Pres Disch Flg, kPag  | 2358.43          | ---       | 6568.95   | ---        |
| Pres Disch Line, kPag | N/A              | ---       | 6500.00   | ---        |
| Pres Ratio F/F        | 2.790            | ---       | 2.779     | ---        |
| Temp Suct, °C         | 25.00            | ---       | 48.89     | ---        |
| Temp Clr Disch, °C    | 48.89            | ---       | 43.33     | ---        |

#### Cylinder Data:

|                         | <b>Throw 2</b> | <b>Throw 4</b> | <b>Throw 1</b> | <b>Throw 3</b> |
|-------------------------|----------------|----------------|----------------|----------------|
| Cyl Model               | 5-1/8JG        | 5-1/8JG        | 3JG            | 3JG            |
| Cyl Bore, in            | 4.750          | 4.750          | 3.000          | 3.000          |
| Cyl RDP (API), kPag     | 5421.8         | 5421.8         | 15983.3        | 15983.3        |
| Cyl MAWP, kPag          | 5964.0         | 5964.0         | 17581.6        | 17581.6        |
| Cyl Action              | DBL            | DBL            | DBL            | DBL            |
| Disp, CFM               | 107.6          | 107.6          | 41.1           | 41.1           |
| Pres Suct Intl, kPag    | 748.31         | 748.31         | 2215.69        | 2215.69        |
| Temp Suct Intl, °C      | 27             | 27             | 51             | 51             |
| Suct Zsph               | 0.9708         | 0.9708         | 0.9389         | 0.9389         |
| Pres Disch Intl, kPag   | 2472.78        | 2472.78        | 6811.55        | 6811.55        |
| Temp Disch Intl, °C     | 103            | 103            | 131            | 131            |
| HE Suct Gas Vel, FPM    | 6961           | 6961           | 6648           | 6648           |
| HE Disch Gas Vel, FPM   | 6311           | 6311           | 5931           | 5931           |
| HE Spcrrs Used/Max      | 0/2            | 0/2            | 0/1            | 0/1            |
| HE Vol Pkt Avail, %     | 1.17+53.15     | 1.17+53.15     | 0.61+42.12     | 0.61+42.12     |
| Vol Pkt Used, %         | 0.00 (V)       | 0.00 (V)       | 0.00 (V)       | 0.00 (V)       |
| HE Min Clr, %           | 18.77          | 18.77          | 18.29          | 18.29          |
| HE Total Clr, %         | 19.95          | 19.95          | 18.89          | 18.89          |
| CE Suct Gas Vel, FPM    | 6571           | 6571           | 5714           | 5714           |
| CE Disch Gas Vel, FPM   | 5957           | 5957           | 5097           | 5097           |
| CE Spcrrs Used/Max      | 0/2            | 0/2            | 0/1            | 0/1            |
| CE Min Clr, %           | 20.36          | 20.36          | 22.17          | 22.17          |
| CE Total Clr, %         | 20.36          | 20.36          | 22.17          | 22.17          |
| Suct Vol Eff HE/CE, %   | 67.9/67.4      | 67.9/67.4      | 69.6/65.5      | 69.6/65.5      |
| Disch Event HE/CE, ms   | 5.7/6.6        | 5.7/6.6        | 5.8/6.5        | 5.8/6.5        |
| Suct Pseudo-Q HE/CE     | 5.3/4.7        | 5.3/4.7        | 4.4/3.3        | 4.4/3.3        |
| Gas Rod Ld Comp, lbf    | 4550 C         | 4550 C         | 5055 C         | 5055 C         |
| Gas Rod Ld Tens, lbf    | 4066 T         | 4066 T         | 3712 T         | 3712 T         |
| Gas Rod Ld Total, lbf   | 8616           | 8616           | 8767           | 8767           |
| Xhd Pin Deg/%Rvrrsl lbf | 144/75.0       | 144/75.0       | 164/56.7       | 164/56.7       |
| Flow Calc, E3m3/D       | 25.359         | 25.359         | 25.360         | 25.360         |
| Cyl BHP                 | 53.1           | 53.1           | 54.3           | 54.3           |





# Ariel Performance



Company: Collicutt Energy Services

Customer: BP Canada

Quote:

Inquiry: 05-25

7.5.5

Case 4:

Project: FH587

### Compressor Data:

|                  |               |                   |        |                   |              |
|------------------|---------------|-------------------|--------|-------------------|--------------|
| Elevation,ft:    | <u>4921.3</u> | Barmtr,kPaa:      | 84.389 | Ambient,°C:       | <u>38.00</u> |
| Frame:           | JGA/4         | Stroke, in:       | 3.00   | Rod Dia, in:      | 1.125        |
| Max RL Tot, lbf: | 20000         | Max RL Tens, lbf: | 10000  | Max RL Comp, lbf: | 11000        |
| Rated RPM:       | 1800          | Rated BHP:        | 560.0  | Rated PS FPM:     | 900.0        |
| Calc RPM:        | 1800.0        | Calc BHP:         | 242    | Calc PS FPM:      | 900.0        |

### Driver Data:

|        |           |
|--------|-----------|
| Type:  | Nat. Gas  |
| Mfg:   | Waukesha  |
| Model: | F18GL/GLD |
| BHP:   | 400       |
| Avail: | 375 (25)  |

### Services

#### Service 1

#### Stage Data:

|                       | #1      | --- | #2      | --- |
|-----------------------|---------|-----|---------|-----|
| Flow Req'd, E3m3/D    | 75.000  | --- | 75.000  | --- |
| Flow Calc, E3m3/D     | 57.630  | --- | 57.630  | --- |
| Cyl BHP per Stage     | 116.8   | --- | 113.2   | --- |
| Specific Gravity      | 0.7059  | --- | 0.7059  | --- |
| Ratio of Sp Ht (N)    | 1.2502  | --- | 1.2536  | --- |
| Comp Suct (Zs)        | 0.9667  | --- | 0.9327  | --- |
| Comp Disch (Zd)       | 0.9558  | --- | 0.9253  | --- |
| Pres Suct Line, kPag  | 900.00  | --- | N/A     | --- |
| Pres Suct Flg, kPag   | 890.16  | --- | 2504.41 | --- |
| Pres Disch Flg, kPag  | 2555.58 | --- | 6568.95 | --- |
| Pres Disch Line, kPag | N/A     | --- | 6500.00 | --- |
| Pres Ratio F/F        | 2.709   | --- | 2.570   | --- |
| Temp Suct, °C         | 25.00   | --- | 48.89   | --- |
| Temp Clr Disch, °C    | 48.89   | --- | 43.33   | --- |

#### Cylinder Data:

#### Throw 2

#### Throw 4

#### Throw 1

#### Throw 3

|                        | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
|------------------------|------------|------------|------------|------------|
| Cyl Bore, in           | 4.750      | 4.750      | 3.000      | 3.000      |
| Cyl RDP (API), kPag    | 5421.8     | 5421.8     | 15983.3    | 15983.3    |
| Cyl MAWP, kPag         | 5964.0     | 5964.0     | 17581.6    | 17581.6    |
| Cyl Action             | DBL        | DBL        | DBL        | DBL        |
| Cyl Disp, CFM          | 107.6      | 107.6      | 41.1       | 41.1       |
| Pres Suct Intl, kPag   | 842.29     | 842.29     | 2401.93    | 2401.93    |
| Temp Suct Intl, °C     | 27         | 27         | 51         | 51         |
| Suct Zsph              | 0.9675     | 0.9675     | 0.9341     | 0.9341     |
| Pres Disch Intl, kPag  | 2680.26    | 2680.26    | 6816.26    | 6816.26    |
| Temp Disch Intl, °C    | 101        | 101        | 125        | 125        |
| HE Suct Gas Vel, FPM   | 6961       | 6961       | 6648       | 6648       |
| HE Disch Gas Vel, FPM  | 6311       | 6311       | 5931       | 5931       |
| HE Spcrrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| HE Vol Pkt Avail, %    | 1.17+53.15 | 1.17+53.15 | 0.61+42.12 | 0.61+42.12 |
| Vol Pkt Used, %        | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   |
| HE Min Clr, %          | 18.77      | 18.77      | 18.29      | 18.29      |
| HE Total Clr, %        | 19.95      | 19.95      | 18.89      | 18.89      |
| CE Suct Gas Vel, FPM   | 6571       | 6571       | 5714       | 5714       |
| CE Disch Gas Vel, FPM  | 5957       | 5957       | 5097       | 5097       |
| CE Spcrrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| CE Min Clr, %          | 20.36      | 20.36      | 22.17      | 22.17      |
| CE Total Clr, %        | 20.36      | 20.36      | 22.17      | 22.17      |
| Suct Vol Eff HE/CE, %  | 69.1/68.6  | 69.1/68.6  | 72.4/68.8  | 72.4/68.8  |
| Disch Event HE/CE, ms  | 5.8/6.8    | 5.8/6.8    | 6.2/6.9    | 6.2/6.9    |
| Suct Pseudo-Q HE/CE    | 5.3/4.7    | 5.3/4.7    | 4.4/3.3    | 4.4/3.3    |
| Gas Rod Ld Comp, lbf   | 4856 C     | 4856 C     | 4895 C     | 4895 C     |
| Gas Rod Ld Tens, lbf   | 4327 T     | 4327 T     | 3526 T     | 3526 T     |
| Gas Rod Ld Total, lbf  | 9183       | 9183       | 8421       | 8421       |
| Xhd Pin Deg/%Rvrsl lbf | 145/74.0   | 145/74.0   | 174/58.6   | 174/58.6   |
| Flow Calc, E3m3/D      | 28.815     | 28.815     | 28.815     | 28.815     |
| Cyl BHP                | 58.4       | 58.4       | 56.6       | 56.6       |



## Ariel Performance



Company: Collicutt Energy Services

Customer: BP Canada



Quote:

Inquiry: 05-25

7.5.5

Case 5:

Project: FH587

### Compressor Data:

|                  |               |                   |        |                   |              |
|------------------|---------------|-------------------|--------|-------------------|--------------|
| Elevation, ft:   | <u>4921.3</u> | Barmtr, kPaa:     | 84.389 | Ambient, °C:      | <u>38.00</u> |
| Frame:           | JGA/4         | Stroke, in:       | 3.00   | Rod Dia, in:      | 1.125        |
| Max RL Tot, lbf: | 20000         | Max RL Tens, lbf: | 10000  | Max RL Comp, lbf: | 11000        |
| Rated RPM:       | 1800          | Rated BHP:        | 560.0  | Rated PS FPM:     | 900.0        |
| Calc RPM:        | 1800.0        | Calc BHP:         | 256    | Calc PS FPM:      | 900.0        |

### Driver Data:

|        |           |
|--------|-----------|
| Type:  | Nat. Gas  |
| Mfg:   | Waukesha  |
| Model: | F18GL/GLD |
| BHP:   | 400       |
| Avail: | 375 (25)  |

### Services

#### Stage Data:

|                       | Service 1<br>#1 |     | #2      |     |
|-----------------------|-----------------|-----|---------|-----|
| Flow Req'd, E3m3/D    | 75.000          | --- | 75.000  | --- |
| Flow Calc, E3m3/D     | 64.607          | --- | 64.607  | --- |
| Cyl BHP per Stage     | 127.3           | --- | 116.7   | --- |
| Specific Gravity      | 0.7059          | --- | 0.7059  | --- |
| Ratio of Sp Ht (N)    | 1.2518          | --- | 1.2559  | --- |
| Comp Suct (Zs)        | 0.9633          | --- | 0.9278  | --- |
| Comp Disch (Zd)       | 0.9520          | --- | 0.9209  | --- |
| Pres Suct Line, kPag  | 1000.00         | --- | N/A     | --- |
| Pres Suct Flg, kPag   | 989.16          | --- | 2697.96 | --- |
| Pres Disch Flg, kPag  | 2751.67         | --- | 6568.95 | --- |
| Pres Disch Line, kPag | N/A             | --- | 6500.00 | --- |
| Pres Ratio F/F        | 2.642           | --- | 2.391   | --- |
| Temp Suct, °C         | 25.00           | --- | 48.89   | --- |
| Temp Clr Disch, °C    | 48.89           | --- | 43.33   | --- |

#### Cylinder Data:

|                        | Throw 2    | Throw 4    | Throw 1    | Throw 3    |
|------------------------|------------|------------|------------|------------|
| Cyl Model              | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
| Cyl Bore, in           | 4.750      | 4.750      | 3.000      | 3.000      |
| Cyl RDP (API), kPag    | 5421.8     | 5421.8     | 15983.3    | 15983.3    |
| Cyl MAWP, kPag         | 5964.0     | 5964.0     | 17581.6    | 17581.6    |
| Cyl Action             | DBL        | DBL        | DBL        | DBL        |
| Cyl Disp, CFM          | 107.6      | 107.6      | 41.1       | 41.1       |
| Pres Suct Intl, kPag   | 936.23     | 936.23     | 2587.20    | 2587.20    |
| Temp Suct Intl, °C     | 27         | 27         | 51         | 51         |
| Suct Zsph              | 0.9642     | 0.9642     | 0.9293     | 0.9293     |
| Pres Disch Intl, kPag  | 2886.68    | 2886.68    | 6820.80    | 6820.80    |
| Temp Disch Intl, °C    | 99         | 99         | 120        | 120        |
| HE Suct Gas Vel, FPM   | 6961       | 6961       | 6648       | 6648       |
| HE Disch Gas Vel, FPM  | 6311       | 6311       | 5931       | 5931       |
| HE Spcrs Used/Max      | 0/2        | 0/2        | 0/1        | 0/1        |
| HE Vol Pkt Avail, %    | 1.17+53.15 | 1.17+53.15 | 0.61+42.12 | 0.61+42.12 |
| Vol Pkt Used, %        | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   |
| HE Min Clr, %          | 18.77      | 18.77      | 18.29      | 18.29      |
| HE Total Clr, %        | 19.95      | 19.95      | 18.89      | 18.89      |
| CE Suct Gas Vel, FPM   | 6571       | 6571       | 5714       | 5714       |
| CE Disch Gas Vel, FPM  | 5957       | 5957       | 5097       | 5097       |
| CE Spcrs Used/Max      | 0/2        | 0/2        | 0/1        | 0/1        |
| CE Min Clr, %          | 20.36      | 20.36      | 22.17      | 22.17      |
| CE Total Clr, %        | 20.36      | 20.36      | 22.17      | 22.17      |
| Suct Vol Eff HE/CE, %  | 70.0/69.6  | 70.0/69.6  | 74.9/71.6  | 74.9/71.6  |
| Disch Event HE/CE, ms  | 6.0/6.9    | 6.0/6.9    | 6.6/7.3    | 6.6/7.3    |
| Suct Pseudo-Q HE/CE    | 5.3/4.7    | 5.3/4.7    | 4.5/3.3    | 4.5/3.3    |
| Gas Rod Ld Comp, lbf   | 5160 C     | 5160 C     | 4736 C     | 4736 C     |
| Gas Rod Ld Tens, lbf   | 4586 T     | 4586 T     | 3341 T     | 3341 T     |
| Gas Rod Ld Total, lbf  | 9746       | 9746       | 8077       | 8077       |
| Xhd Pin Deg/%RvrsI lbf | 147/74.4   | 147/74.4   | 168/61.0   | 168/61.0   |
| Flow Calc, E3m3/D      | 32.303     | 32.303     | 32.303     | 32.303     |
| Cyl BHP                | 63.7       | 63.7       | 58.3       | 58.3       |





# Ariel Performance



Company: Collicutt Energy Services

Customer: BP Canada

Quote:

Inquiry: 05-25

7.5.5

Case 6:

Project: FH587

### Compressor Data:

|                  |               |                   |        |                   |              |
|------------------|---------------|-------------------|--------|-------------------|--------------|
| Elevation,ft:    | <u>4921.3</u> | Barmtr,kPaa:      | 84.389 | Ambient,°C:       | <u>38.00</u> |
| Frame:           | JGA/4         | Stroke, in:       | 3.00   | Rod Dia, in:      | 1.125        |
| Max RL Tot, lbf: | 20000         | Max RL Tens, lbf: | 10000  | Max RL Comp, lbf: | 11000        |
| Rated RPM:       | 1800          | Rated BHP:        | 560.0  | Rated PS FPM:     | 900.0        |
| Calc RPM:        | 1800.0        | Calc BHP:         | 269    | Calc PS FPM:      | 900.0        |

### Driver Data:

|        |           |
|--------|-----------|
| Type:  | Nat. Gas  |
| Mfg:   | Waukesha  |
| Model: | F18GL/GLD |
| BHP:   | 400       |
| Avail: | 375 (25)  |

### Services

#### Service 1

#### Stage Data:

##### #1

##### #2

|                       |         |     |         |     |
|-----------------------|---------|-----|---------|-----|
| Flow Req'd, E3m3/D    | 75.000  | --- | 75.000  | --- |
| Flow Calc, E3m3/D     | 71.649  | --- | 71.649  | --- |
| Cyl BHP per Stage     | 137.6   | --- | 119.0   | --- |
| Specific Gravity      | 0.7059  | --- | 0.7059  | --- |
| Ratio of Sp Ht (N)    | 1.2533  | --- | 1.2581  | --- |
| Comp Suct (Zs)        | 0.9599  | --- | 0.9231  | --- |
| Comp Disch (Zd)       | 0.9483  | --- | 0.9167  | --- |
| Pres Suct Line, kPag  | 1100.00 | --- | N/A     | --- |
| Pres Suct Flg, kPag   | 1088.16 | --- | 2890.67 | --- |
| Pres Disch Flg, kPag  | 2946.80 | --- | 6568.95 | --- |
| Pres Disch Line, kPag | N/A     | --- | 6500.00 | --- |
| Pres Ratio F/F        | 2.585   | --- | 2.236   | --- |
| Temp Suct, °C         | 25.00   | --- | 48.89   | --- |
| Temp Cir Disch, °C    | 48.89   | --- | 43.33   | --- |

#### Cylinder Data:

##### Throw 2

##### Throw 4

##### Throw 1

##### Throw 3

|                        |            |            |            |            |
|------------------------|------------|------------|------------|------------|
| Cyl Model              | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
| Cyl Bore, in           | 4.750      | 4.750      | 3.000      | 3.000      |
| Cyl RDP (API), kPag    | 5421.8     | 5421.8     | 15983.3    | 15983.3    |
| Cyl MAWP, kPag         | 5964.0     | 5964.0     | 17581.6    | 17581.6    |
| Cyl Action             | DBL        | DBL        | DBL        | DBL        |
| Cyl Disp, CFM          | 107.6      | 107.6      | 41.1       | 41.1       |
| Pres Suct Intl, kPag   | 1030.14    | 1030.14    | 2771.58    | 2771.58    |
| Temp Suct Intl, °C     | 27         | 27         | 51         | 51         |
| Suct Zsph              | 0.9609     | 0.9609     | 0.9245     | 0.9245     |
| Pres Disch Intl, kPag  | 3092.17    | 3092.17    | 6825.20    | 6825.20    |
| Temp Disch Intl, °C    | 98         | 98         | 115        | 115        |
| HE Suct Gas Vel, FPM   | 6961       | 6961       | 6648       | 6648       |
| HE Disch Gas Vel, FPM  | 6311       | 6311       | 5931       | 5931       |
| HE Spcrrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| HE Vol Pkt Avail, %    | 1.17+53.15 | 1.17+53.15 | 0.61+42.12 | 0.61+42.12 |
| Vol Pkt Used, %        | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   |
| HE Min Cir, %          | 18.77      | 18.77      | 18.29      | 18.29      |
| HE Total Cir, %        | 19.95      | 19.95      | 18.89      | 18.89      |
| CE Suct Gas Vel, FPM   | 6571       | 6571       | 5714       | 5714       |
| CE Disch Gas Vel, FPM  | 5957       | 5957       | 5097       | 5097       |
| CE Spcrrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| CE Min Cir, %          | 20.36      | 20.36      | 22.17      | 22.17      |
| CE Total Cir, %        | 20.36      | 20.36      | 22.17      | 22.17      |
| Suct Vol Eff HE/CE, %  | 70.8/70.4  | 70.8/70.4  | 77.0/74.1  | 77.0/74.1  |
| Disch Event HE/CE, ms  | 6.1/6.9    | 6.1/6.9    | 6.9/7.7    | 6.9/7.7    |
| Suct Pseudo-Q HE/CE    | 5.3/4.7    | 5.3/4.7    | 4.5/3.3    | 4.5/3.3    |
| Gas Rod Ld Comp, lbf   | 5461 C     | 5461 C     | 4578 C     | 4578 C     |
| Gas Rod Ld Tens, lbf   | 4842 T     | 4842 T     | 3156 T     | 3156 T     |
| Gas Rod Ld Total, lbf  | 10303      | 10303      | 7734       | 7734       |
| Xhd Pin Deg/%Rvrs/ lbf | 156/75.0   | 156/75.0   | 165/63.3   | 165/63.3   |
| Flow Calc, E3m3/D      | 35.825     | 35.825     | 35.825     | 35.825     |
| Cyl BHP                | 68.8       | 68.8       | 59.5       | 59.5       |





# Ariel Performance

Company: Collicutt Energy Services

Customer: BP Canada

Quote:

Inquiry: 05-25

7.5.5

Case 7:

Project: FH587



## Compressor Data:

|                  |               |                   |        |                   |              |
|------------------|---------------|-------------------|--------|-------------------|--------------|
| Elevation, ft:   | <u>4921.3</u> | Barmtr, kPaa:     | 84.389 | Ambient, °C:      | <u>38.00</u> |
| Frame:           | JGA/4         | Stroke, in:       | 3.00   | Rod Dia, in:      | 1.125        |
| Max RL Tot, lbf: | 20000         | Max RL Tens, lbf: | 10000  | Max RL Comp, lbf: | 11000        |
| Rated RPM:       | 1800          | Rated BHP:        | 560.0  | Rated PS FPM:     | 900.0        |
| Calc RPM:        | 1800.0        | Calc BHP:         | 280    | Calc PS FPM:      | 900.0        |

## Driver Data:

|        |           |
|--------|-----------|
| Type:  | Nat. Gas  |
| Mfg:   | Waukesha  |
| Model: | F18GL/GLD |
| BHP:   | 400       |
| Avail: | 375 (25)  |

## Services

### Stage Data:

|                       | Service 1 | #1  | --- | #2      | --- |
|-----------------------|-----------|-----|-----|---------|-----|
| Flow Req'd, E3m3/D    | 75.000    | --- | --- | 75.000  | --- |
| Flow Calc, E3m3/D     | 78.756    | --- | --- | 78.756  | --- |
| Cyl BHP per Stage     | 147.9     | --- | --- | 120.3   | --- |
| Specific Gravity      | 0.7059    | --- | --- | 0.7059  | --- |
| Ratio of Sp Ht (N)    | 1.2547    | --- | --- | 1.2601  | --- |
| Comp Suct (Zs)        | 0.9566    | --- | --- | 0.9184  | --- |
| Comp Disch (Zd)       | 0.9446    | --- | --- | 0.9125  | --- |
| Pres Suct Line, kPag  | 1200.00   | --- | --- | N/A     | --- |
| Pres Suct Flg, kPag   | 1187.16   | --- | --- | 3082.61 | --- |
| Pres Disch Flg, kPag  | 3141.06   | --- | --- | 6568.95 | --- |
| Pres Disch Line, kPag | N/A       | --- | --- | 6500.00 | --- |
| Pres Ratio F/F        | 2.537     | --- | --- | 2.101   | --- |
| Temp Suct, °C         | 25.00     | --- | --- | 48.89   | --- |
| Temp Clr Disch, °C    | 48.89     | --- | --- | 43.33   | --- |

### Cylinder Data:

|                        | Throw 2    | Throw 4    | Throw 1    | Throw 3    |
|------------------------|------------|------------|------------|------------|
| Cyl Model              | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
| Cyl Bore, in           | 4.750      | 4.750      | 3.000      | 3.000      |
| Cyl RDP (API), kPag    | 5421.8     | 5421.8     | 15983.3    | 15983.3    |
| Cyl MAWP, kPag         | 5964.0     | 5964.0     | 17581.6    | 17581.6    |
| Cyl Action             | DBL        | DBL        | DBL        | DBL        |
| Disp, CFM              | 107.6      | 107.6      | 41.1       | 41.1       |
| Pres Suct Intl, kPag   | 1124.01    | 1124.01    | 2955.14    | 2955.14    |
| Temp Suct Intl, °C     | 27         | 27         | 50         | 50         |
| Suct Zsph              | 0.9576     | 0.9576     | 0.9198     | 0.9198     |
| Pres Disch Intl, kPag  | 3296.80    | 3296.80    | 6829.47    | 6829.47    |
| Temp Disch Intl, °C    | 97         | 97         | 110        | 110        |
| HE Suct Gas Vel, FPM   | 6961       | 6961       | 6648       | 6648       |
| HE Disch Gas Vel, FPM  | 6311       | 6311       | 5931       | 5931       |
| HE Spcrrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| HE Vol Pkt Avail, %    | 1.17+53.15 | 1.17+53.15 | 0.61+42.12 | 0.61+42.12 |
| Vol Pkt Used, %        | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   |
| HE Min Clr, %          | 18.77      | 18.77      | 18.29      | 18.29      |
| HE Total Clr, %        | 19.95      | 19.95      | 18.89      | 18.89      |
| CE Suct Gas Vel, FPM   | 6571       | 6571       | 5714       | 5714       |
| CE Disch Gas Vel, FPM  | 5957       | 5957       | 5097       | 5097       |
| CE Spcrrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| CE Min Clr, %          | 20.36      | 20.36      | 22.17      | 22.17      |
| CE Total Clr, %        | 20.36      | 20.36      | 22.17      | 22.17      |
| Suct Vol Eff HE/CE, %  | 71.6/71.1  | 71.6/71.1  | 78.9/76.3  | 78.9/76.3  |
| Disch Event HE/CE, ms  | 6.2/7.0    | 6.2/7.0    | 7.2/8.0    | 7.2/8.0    |
| Suct Pseudo-Q HE/CE    | 5.3/4.8    | 5.3/4.8    | 4.5/3.3    | 4.5/3.3    |
| Gas Rod Ld Comp, lbf   | 5760 C     | 5760 C     | 4420 C     | 4420 C     |
| Gas Rod Ld Tens, lbf   | 5097 T     | 5097 T     | 2973 T     | 2973 T     |
| Gas Rod Ld Total, lbf  | 10857      | 10857      | 7393       | 7393       |
| Xhd Pin Deg/%Rvrrs lbf | 167/75.8   | 167/75.8   | 161/64.8   | 161/64.8   |
| Flow Calc, E3m3/D      | 39.378     | 39.378     | 39.378     | 39.378     |
| Cyl BHP                | 73.9       | 73.9       | 60.2       | 60.2       |





# Ariel Performance



Company: Collicutt Energy Services

Customer: BP Canada

Quote:

Inquiry: 05-25

7.5.5

Case 8:

Project: FH587

## Compressor Data:

|                  |               |                   |        |                   |              |
|------------------|---------------|-------------------|--------|-------------------|--------------|
| Elevation,ft:    | <u>4921.3</u> | Barmtr,kPaa:      | 84.389 | Ambient,°C:       | <u>38.00</u> |
| Frame:           | JGA/4         | Stroke, in:       | 3.00   | Rod Dia, in:      | 1.125        |
| Max RL Tot, lbf: | 20000         | Max RL Tens, lbf: | 10000  | Max RL Comp, lbf: | 11000        |
| Rated RPM:       | 1800          | Rated BHP:        | 560.0  | Rated PS FPM:     | 900.0        |
| Calc RPM:        | 1800.0        | Calc BHP:         | 291    | Calc PS FPM:      | 900.0        |

## Driver Data:

|        |           |
|--------|-----------|
| Type:  | Nat. Gas  |
| Mfg:   | Waukesha  |
| Model: | F18GL/GLD |
| BHP:   | 400       |
| Avail: | 375 (25)  |

## Services

### Service 1

#### Stage Data:

#### #1

#### #2

|                       |         |     |         |     |
|-----------------------|---------|-----|---------|-----|
| Flow Req'd, E3m3/D    | 75.000  | --- | 75.000  | --- |
| Flow Calc, E3m3/D     | 85.927  | --- | 85.926  | --- |
| Cyl BHP per Stage     | 158.0   | --- | 120.8   | --- |
| Specific Gravity      | 0.7059  | --- | 0.7059  | --- |
| Ratio of Sp Ht (N)    | 1.2561  | --- | 1.2621  | --- |
| Comp Suct (Zs)        | 0.9532  | --- | 0.9137  | --- |
| Comp Disch (Zd)       | 0.9410  | --- | 0.9084  | --- |
| Pres Suct Line, kPag  | 1300.00 | --- | N/A     | --- |
| Pres Suct Flg, kPag   | 1286.16 | --- | 3273.83 | --- |
| Pres Disch Flg, kPag  | 3334.52 | --- | 6568.95 | --- |
| Pres Disch Line, kPag | N/A     | --- | 6500.00 | --- |
| Pres Ratio F/F        | 2.495   | --- | 1.981   | --- |
| Temp Suct, °C         | 25.00   | --- | 48.89   | --- |
| Temp Clr Disch, °C    | 48.89   | --- | 43.33   | --- |

#### Cylinder Data:

#### Throw 2

#### Throw 4

#### Throw 1

#### Throw 3

|                        |            |            |            |            |
|------------------------|------------|------------|------------|------------|
| Cyl Model              | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
| Cyl Bore, in           | 4.750      | 4.750      | 3.000      | 3.000      |
| Cyl RDP (API), kPag    | 5421.8     | 5421.8     | 15983.3    | 15983.3    |
| Cyl MAWP, kPag         | 5964.0     | 5964.0     | 17581.6    | 17581.6    |
| Cyl Action             | DBL        | DBL        | DBL        | DBL        |
| Cyl Disp, CFM          | 107.6      | 107.6      | 41.1       | 41.1       |
| Pres Suct Intl, kPag   | 1217.85    | 1217.85    | 3137.92    | 3137.92    |
| Temp Suct Intl, °C     | 27         | 27         | 50         | 50         |
| Suct Zsph              | 0.9543     | 0.9543     | 0.9151     | 0.9151     |
| Pres Disch Intl, kPag  | 3500.64    | 3500.64    | 6833.63    | 6833.63    |
| Temp Disch Intl, °C    | 96         | 96         | 106        | 106        |
| HE Suct Gas Vel, FPM   | 6961       | 6961       | 6648       | 6648       |
| HE Disch Gas Vel, FPM  | 6311       | 6311       | 5931       | 5931       |
| HE Spcrs Used/Max      | 0/2        | 0/2        | 0/1        | 0/1        |
| HE Vol Pkt Avail, %    | 1.17+53.15 | 1.17+53.15 | 0.61+42.12 | 0.61+42.12 |
| Vol Pkt Used, %        | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   |
| HE Min Clr, %          | 18.77      | 18.77      | 18.29      | 18.29      |
| HE Total Clr, %        | 19.95      | 19.95      | 18.89      | 18.89      |
| CE Suct Gas Vel, FPM   | 6571       | 6571       | 5714       | 5714       |
| CE Disch Gas Vel, FPM  | 5957       | 5957       | 5097       | 5097       |
| CE Spcrs Used/Max      | 0/2        | 0/2        | 0/1        | 0/1        |
| CE Min Clr, %          | 20.36      | 20.36      | 22.17      | 22.17      |
| CE Total Clr, %        | 20.36      | 20.36      | 22.17      | 22.17      |
| Suct Vol Eff HE/CE, %  | 72.2/71.7  | 72.2/71.7  | 80.6/78.3  | 80.6/78.3  |
| Disch Event HE/CE, ms  | 6.3/7.1    | 6.3/7.1    | 7.5/8.3    | 7.5/8.3    |
| Suct Pseudo-Q HE/CE    | 5.4/4.8    | 5.4/4.8    | 4.5/3.4    | 4.5/3.4    |
| Gas Rod Ld Comp, lbf   | 6057 C     | 6057 C     | 4263 C     | 4263 C     |
| Gas Rod Ld Tens, lbf   | 5349 T     | 5349 T     | 2790 T     | 2790 T     |
| Gas Rod Ld Total, lbf  | 11406      | 11406      | 7053       | 7053       |
| Xhd Pin Deg/%Rvrs/ lbf | 169/76.9   | 169/76.9   | 159/66.2   | 159/66.2   |
| Flow Calc, E3m3/D      | 42.963     | 42.963     | 42.963     | 42.963     |
| Cyl BHP                | 79.0       | 79.0       | 60.4       | 60.4       |



## Ariel Performance



Company: Collicutt Energy Services

Customer: BP Canada

Quote:

Inquiry: 05-25



7.5.5

Case 9:

Project: FH587

**Compressor Data:**

|                  |               |                   |        |                   |              |
|------------------|---------------|-------------------|--------|-------------------|--------------|
| Elevation, ft:   | <u>4921.3</u> | Barmtr, kPaa:     | 84.389 | Ambient, °C:      | <u>38.00</u> |
| Frame:           | JGA/4         | Stroke, in:       | 3.00   | Rod Dia, in:      | 1.125        |
| Max RL Tot, lbf: | 20000         | Max RL Tens, lbf: | 10000  | Max RL Comp, lbf: | 11000        |
| Rated RPM:       | 1800          | Rated BHP:        | 560.0  | Rated PS FPM:     | 900.0        |
| Calc RPM:        | 1800.0        | Calc BHP:         | 300    | Calc PS FPM:      | 900.0        |

**Driver Data:**

|        |           |
|--------|-----------|
| Type:  | Nat. Gas  |
| Mfg:   | Waukesha  |
| Model: | F18GL/GLD |
| BHP:   | 400       |
| Avail: | 375 (25)  |

**Services**

**Stage Data:**

|                       | <b>Service 1</b> | <b>#1</b> | <b>#2</b> | <b>---</b> |
|-----------------------|------------------|-----------|-----------|------------|
| Flow Req'd, E3m3/D    | 75.000           | ---       | 75.000    | ---        |
| Flow Calc, E3m3/D     | 93.160           | ---       | 93.160    | ---        |
| Cyl BHP per Stage     | 168.1            | ---       | 120.3     | ---        |
| Specific Gravity      | 0.7060           | ---       | 0.7060    | ---        |
| Ratio of Sp Ht (N)    | 1.2575           | ---       | 1.2640    | ---        |
| Comp Suct (Zs)        | 0.9499           | ---       | 0.9091    | ---        |
| Comp Disch (Zd)       | 0.9375           | ---       | 0.9044    | ---        |
| Pres Suct Line, kPag  | 1400.00          | ---       | N/A       | ---        |
| Pres Suct Flg, kPag   | 1385.16          | ---       | 3464.41   | ---        |
| Pres Disch Flg, kPag  | 3527.25          | ---       | 6568.95   | ---        |
| Pres Disch Line, kPag | N/A              | ---       | 6500.00   | ---        |
| Pres Ratio F/F        | 2.458            | ---       | 1.875     | ---        |
| Temp Suct, °C         | 25.00            | ---       | 48.89     | ---        |
| Temp Clr Disch, °C    | 48.89            | ---       | 43.33     | ---        |

**Cylinder Data:**

|                        | <b>Throw 2</b> | <b>Throw 4</b> | <b>Throw 1</b> | <b>Throw 3</b> |
|------------------------|----------------|----------------|----------------|----------------|
| Cyl Model              | 5-1/8JG        | 5-1/8JG        | 3JG            | 3JG            |
| Cyl Bore, in           | 4.750          | 4.750          | 3.000          | 3.000          |
| Cyl RDP (API), kPag    | 5421.8         | 5421.8         | 15983.3        | 15983.3        |
| Cyl MAWP, kPag         | 5964.0         | 5964.0         | 17581.6        | 17581.6        |
| Cyl Action             | DBL            | DBL            | DBL            | DBL            |
| Cyl Disp, CFM          | 107.6          | 107.6          | 41.1           | 41.1           |
| Pres Suct Intl, kPag   | 1311.65        | 1311.65        | 3320.01        | 3320.01        |
| Temp Suct Intl, °C     | 27             | 27             | 50             | 50             |
| Suct Zsph              | 0.9510         | 0.9510         | 0.9105         | 0.9105         |
| Pres Disch Intl, kPag  | 3703.78        | 3703.78        | 6837.69        | 6837.69        |
| Temp Disch Intl, °C    | 95             | 95             | 102            | 102            |
| HE Suct Gas Vel, FPM   | 6961           | 6961           | 6648           | 6648           |
| HE Disch Gas Vel, FPM  | 6311           | 6311           | 5931           | 5931           |
| HE Spcrrs Used/Max     | 0/2            | 0/2            | 0/1            | 0/1            |
| HE Vol Pkt Avail, %    | 1.17+53.15     | 1.17+53.15     | 0.61+42.12     | 0.61+42.12     |
| Vol Pkt Used, %        | 0.00 (V)       | 0.00 (V)       | 0.00 (V)       | 0.00 (V)       |
| HE Min Clr, %          | 18.77          | 18.77          | 18.29          | 18.29          |
| HE Total Clr, %        | 19.95          | 19.95          | 18.89          | 18.89          |
| CE Suct Gas Vel, FPM   | 6571           | 6571           | 5714           | 5714           |
| CE Disch Gas Vel, FPM  | 5957           | 5957           | 5097           | 5097           |
| CE Spcrrs Used/Max     | 0/2            | 0/2            | 0/1            | 0/1            |
| CE Min Clr, %          | 20.36          | 20.36          | 22.17          | 22.17          |
| CE Total Clr, %        | 20.36          | 20.36          | 22.17          | 22.17          |
| Suct Vol Eff HE/CE, %  | 72.7/72.3      | 72.7/72.3      | 82.1/80.0      | 82.1/80.0      |
| Disch Event HE/CE, ms  | 6.3/7.2        | 6.3/7.2        | 7.9/8.7        | 7.9/8.7        |
| Suct Pseudo-Q HE/CE    | 5.4/4.8        | 5.4/4.8        | 4.6/3.4        | 4.6/3.4        |
| Gas Rod Ld Comp, lbf   | 6352 C         | 6352 C         | 4106 C         | 4106 C         |
| Gas Rod Ld Tens, lbf   | 5600 T         | 5600 T         | 2607 T         | 2607 T         |
| Gas Rod Ld Total, lbf  | 11952          | 11952          | 6713           | 6713           |
| Xhd Pin Deg/%Rvrrs lbf | 171/77.4       | 171/77.4       | 158/67.3       | 158/67.3       |
| Flow Calc, E3m3/D      | 46.580         | 46.580         | 46.580         | 46.580         |
| Cyl BHP                | 84.0           | 84.0           | 60.2           | 60.2           |





# Ariel Performance



Company: Collicutt Energy Services

Customer: BP Canada

Quote:

Inquiry: 05-25

7.5.5

Case 10:

Project: FH587

## Compressor Data:

|                  |               |                   |        |                   |              |
|------------------|---------------|-------------------|--------|-------------------|--------------|
| Elevation,ft:    | <u>4921.3</u> | Barmtr,kPaa:      | 84.389 | Ambient,°C:       | <u>38.00</u> |
| Frame:           | JGA/4         | Stroke, in:       | 3.00   | Rod Dia, in:      | 1.125        |
| Max RL Tot, lbf: | 20000         | Max RL Tens, lbf: | 10000  | Max RL Comp, lbf: | 11000        |
| Rated RPM:       | 1800          | Rated BHP:        | 560.0  | Rated PS FPM:     | 900.0        |
| Calc RPM:        | 1800.0        | Calc BHP:         | 194    | Calc PS FPM:      | 900.0        |

## Driver Data:

|        |           |
|--------|-----------|
| Type:  | Nat. Gas  |
| Mfg:   | Waukesha  |
| Model: | F18GL/GLD |
| BHP:   | 400       |
| Avail: | 375 (25)  |

## Services

### Service 1

#### Stage Data:

|                       | #1      |     | #2      |     |
|-----------------------|---------|-----|---------|-----|
| Flow Req'd, E3m3/D    | 75.000  | --- | 75.000  | --- |
| Flow Calc, E3m3/D     | 36.529  | --- | 36.529  | --- |
| Cyl BHP per Stage     | 84.7    | --- | 97.4    | --- |
| Specific Gravity      | 0.7058  | --- | 0.7058  | --- |
| Ratio of Sp Ht (N)    | 1.2448  | --- | 1.2460  | --- |
| Comp Suct (Zs)        | 0.9768  | --- | 0.9463  | --- |
| Comp Disch (Zd)       | 0.9673  | --- | 0.9385  | --- |
| Pres Suct Line, kPag  | 600.00  | --- | N/A     | --- |
| Pres Suct Flg, kPag   | 593.16  | --- | 1963.67 | --- |
| Pres Disch Flg, kPag  | 2007.93 | --- | 7070.84 | --- |
| Pres Disch Line, kPag | N/A     | --- | 7000.00 | --- |
| Pres Ratio F/F        | 3.088   | --- | 3.494   | --- |
| Temp Suct, °C         | 25.00   | --- | 48.89   | --- |
| Temp Clr Disch, °C    | 48.89   | --- | 43.33   | --- |

#### Cylinder Data:

### Throw 2

### Throw 4

### Throw 1

### Throw 3

|                        | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
|------------------------|------------|------------|------------|------------|
| Cyl Model              | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
| Cyl Bore, in           | 4.750      | 4.750      | 3.000      | 3.000      |
| Cyl RDP (API), kPag    | 5421.8     | 5421.8     | 15983.3    | 15983.3    |
| Cyl MAWP, kPag         | 5964.0     | 5964.0     | 17581.6    | 17581.6    |
| Cyl Action             | DBL        | DBL        | DBL        | DBL        |
| Cyl Disp, CFM          | 107.6      | 107.6      | 41.1       | 41.1       |
| Pres Suct Intl, kPag   | 560.25     | 560.25     | 1883.93    | 1883.93    |
| Temp Suct Intl, °C     | 27         | 27         | 51         | 51         |
| Suct Zsph              | 0.9774     | 0.9774     | 0.9477     | 0.9477     |
| Pres Disch Intl, kPag  | 2103.39    | 2103.39    | 7318.53    | 7318.53    |
| Temp Disch Intl, °C    | 109        | 109        | 149        | 149        |
| HE Suct Gas Vel, FPM   | 6961       | 6961       | 6648       | 6648       |
| HE Disch Gas Vel, FPM  | 6311       | 6311       | 5931       | 5931       |
| HE Spcrs Used/Max      | 0/2        | 0/2        | 0/1        | 0/1        |
| HE Vol Pkt Avail, %    | 1.17+53.15 | 1.17+53.15 | 0.61+42.12 | 0.61+42.12 |
| Vol Pkt Used, %        | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   |
| HE Min Clr, %          | 18.77      | 18.77      | 18.29      | 18.29      |
| HE Total Clr, %        | 19.95      | 19.95      | 18.89      | 18.89      |
| CE Suct Gas Vel, FPM   | 6571       | 6571       | 5714       | 5714       |
| CE Disch Gas Vel, FPM  | 5957       | 5957       | 5097       | 5097       |
| CE Spcrs Used/Max      | 0/2        | 0/2        | 0/1        | 0/1        |
| CE Min Clr, %          | 20.36      | 20.36      | 22.17      | 22.17      |
| CE Total Clr, %        | 20.36      | 20.36      | 22.17      | 22.17      |
| Suct Vol Eff HE/CE, %  | 63.7/63.1  | 63.7/63.1  | 60.2/54.6  | 60.2/54.6  |
| Disch Event HE/CE, ms  | 5.3/6.1    | 5.3/6.1    | 4.8/5.4    | 4.8/5.4    |
| Suct Pseudo-Q HE/CE    | 5.2/4.6    | 5.2/4.6    | 4.4/3.2    | 4.4/3.2    |
| Gas Rod Ld Comp, lbf   | 4056 C     | 4056 C     | 5870 C     | 5870 C     |
| Gas Rod Ld Tens, lbf   | 3654 T     | 3654 T     | 4496 T     | 4496 T     |
| Gas Rod Ld Total, lbf  | 7710       | 7710       | 10366      | 10366      |
| Xhd Pin Deg/%Rvrs/ lbf | 165/85.4   | 165/85.4   | 175/56.0   | 175/56.0   |
| Flow Calc, E3m3/D      | 18.265     | 18.265     | 18.264     | 18.264     |
| Cyl BHP                | 42.4       | 42.4       | 48.7       | 48.7       |





# Ariel Performance

Company: Collicutt Energy Services

Customer: BP Canada

Quote:

Inquiry: 05-25

7.5.5 Case 11:

Project: FH587



## Compressor Data:

|                  |               |                   |        |                   |              |
|------------------|---------------|-------------------|--------|-------------------|--------------|
| Elevation, ft:   | <u>4921.3</u> | Barmtr, kPaa:     | 84.389 | Ambient, °C:      | <u>38.00</u> |
| Frame:           | JGA/4         | Stroke, in:       | 3.00   | Rod Dia, in:      | 1.125        |
| Max RL Tot, lbf: | 20000         | Max RL Tens, lbf: | 10000  | Max RL Comp, lbf: | 11000        |
| Rated RPM:       | 1800          | Rated BHP:        | 560.0  | Rated PS FPM:     | 900.0        |
| Calc RPM:        | 1800.0        | Calc BHP:         | 214    | Calc PS FPM:      | 900.0        |

## Driver Data:

|        |           |
|--------|-----------|
| Type:  | Nat. Gas  |
| Mfg:   | Waukesha  |
| Model: | F18GL/GLD |
| BHP:   | 400       |
| Avail: | 375 (25)  |

## Services

### Stage Data:

|                       | Service 1 | #1  | #2      | --- |
|-----------------------|-----------|-----|---------|-----|
| Flow Req'd, E3m3/D    | 75.000    | --- | 75.000  | --- |
| Flow Calc, E3m3/D     | 43.291    | --- | 43.290  | --- |
| Cyl BHP per Stage     | 96.0      | --- | 106.0   | --- |
| Specific Gravity      | 0.7058    | --- | 0.7058  | --- |
| Ratio of Sp Ht (N)    | 1.2467    | --- | 1.2486  | --- |
| Comp Suct (Zs)        | 0.9734    | --- | 0.9413  | --- |
| Comp Disch (Zd)       | 0.9634    | --- | 0.9338  | --- |
| Pres Suct Line, kPag  | 700.00    | --- | N/A     | --- |
| Pres Suct Flg, kPag   | 692.16    | --- | 2160.53 | --- |
| Pres Disch Flg, kPag  | 2207.91   | --- | 7070.84 | --- |
| Pres Disch Line, kPag | N/A       | --- | 7000.00 | --- |
| Pres Ratio F/F        | 2.952     | --- | 3.187   | --- |
| Temp Suct, °C         | 25.00     | --- | 48.89   | --- |
| Temp Clr Disch, °C    | 48.89     | --- | 43.33   | --- |

### Cylinder Data:

|                        | Throw 2    | Throw 4    | Throw 1    | Throw 3    |
|------------------------|------------|------------|------------|------------|
| Cyl Model              | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
| Cyl Bore, in           | 4.750      | 4.750      | 3.000      | 3.000      |
| Cyl RDP (API), kPag    | 5421.8     | 5421.8     | 15983.3    | 15983.3    |
| Cyl MAWP, kPag         | 5964.0     | 5964.0     | 17581.6    | 17581.6    |
| Actn                   | DBL        | DBL        | DBL        | DBL        |
| Disp, CFM              | 107.6      | 107.6      | 41.1       | 41.1       |
| Pres Suct Intl, kPag   | 654.30     | 654.30     | 2072.61    | 2072.61    |
| Temp Suct Intl, °C     | 27         | 27         | 51         | 51         |
| Suct Zsph              | 0.9741     | 0.9741     | 0.9428     | 0.9428     |
| Pres Disch Intl, kPag  | 2313.74    | 2313.74    | 7323.92    | 7323.92    |
| Temp Disch Intl, °C    | 106        | 106        | 142        | 142        |
| HE Suct Gas Vel, FPM   | 6961       | 6961       | 6648       | 6648       |
| HE Disch Gas Vel, FPM  | 6311       | 6311       | 5931       | 5931       |
| HE Spcrrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| HE Vol Pkt Avail, %    | 1.17+53.15 | 1.17+53.15 | 0.61+42.12 | 0.61+42.12 |
| Vol Pkt Used, %        | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   |
| HE Min Clr, %          | 18.77      | 18.77      | 18.29      | 18.29      |
| HE Total Clr, %        | 19.95      | 19.95      | 18.89      | 18.89      |
| CE Suct Gas Vel, FPM   | 6571       | 6571       | 5714       | 5714       |
| CE Disch Gas Vel, FPM  | 5957       | 5957       | 5097       | 5097       |
| CE Spcrrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| CE Min Clr, %          | 20.36      | 20.36      | 22.17      | 22.17      |
| CE Total Clr, %        | 20.36      | 20.36      | 22.17      | 22.17      |
| Suct Vol Eff HE/CE, %  | 65.6/65.1  | 65.6/65.1  | 64.2/59.2  | 64.2/59.2  |
| Disch Event HE/CE, ms  | 5.5/6.3    | 5.5/6.3    | 5.2/5.8    | 5.2/5.8    |
| Suct Pseudo-Q HE/CE    | 5.2/4.7    | 5.2/4.7    | 4.4/3.2    | 4.4/3.2    |
| Gas Rod Ld Comp, lbf   | 4369 C     | 4369 C     | 5709 C     | 5709 C     |
| Gas Rod Ld Tens, lbf   | 3922 T     | 3922 T     | 4308 T     | 4308 T     |
| Gas Rod Ld Total, lbf  | 8291       | 8291       | 10017      | 10017      |
| Xhd Pin Deg/%Rvrrs lbf | 145/78.6   | 145/78.6   | 175/54.6   | 175/54.6   |
| Flow Calc, E3m3/D      | 21.646     | 21.646     | 21.645     | 21.645     |
| Cyl BHP                | 48.0       | 48.0       | 53.0       | 53.0       |





# Ariel Performance



Company: Collicutt Energy Services  
 Quote:  
 Case 12:

Customer: BP Canada  
 Inquiry: 05-25  
 Project: FH587

7.5.5

### Compressor Data:

|                  |               |                   |        |                   |              |
|------------------|---------------|-------------------|--------|-------------------|--------------|
| Elevation,ft:    | <u>4921.3</u> | Barmtr,kPaa:      | 84.389 | Ambient,°C:       | <u>38.00</u> |
| Frame:           | JGA/4         | Stroke, in:       | 3.00   | Rod Dia, in:      | 1.125        |
| Max RL Tot, lbf: | 20000         | Max RL Tens, lbf: | 10000  | Max RL Comp, lbf: | 11000        |
| Rated RPM:       | 1800          | Rated BHP:        | 560.0  | Rated PS FPM:     | 900.0        |
| Calc RPM:        | 1800.0        | Calc BHP:         | 232    | Calc PS FPM:      | 900.0        |

### Driver Data:

|        |           |
|--------|-----------|
| Type:  | Nat. Gas  |
| Mfg:   | Waukesha  |
| Model: | F18GL/GLD |
| BHP:   | 400       |
| Avail: | 375 (25)  |

### Services

#### Service 1

#### Stage Data:

|                       | #1      | --- | #2      | --- |
|-----------------------|---------|-----|---------|-----|
| Flow Req'd, E3m3/D    | 75.000  | --- | 75.000  | --- |
| Flow Calc, E3m3/D     | 50.124  | --- | 50.124  | --- |
| Cyl BHP per Stage     | 107.0   | --- | 113.1   | --- |
| Specific Gravity      | 0.7058  | --- | 0.7058  | --- |
| Ratio of Sp Ht (N)    | 1.2484  | --- | 1.2511  | --- |
| Comp Suct (Zs)        | 0.9700  | --- | 0.9364  | --- |
| Comp Disch (Zd)       | 0.9595  | --- | 0.9292  | --- |
| Pres Suct Line, kPag  | 800.00  | --- | N/A     | --- |
| Pres Suct Flg, kPag   | 791.16  | --- | 2356.27 | --- |
| Pres Disch Flg, kPag  | 2406.58 | --- | 7070.84 | --- |
| Pres Disch Line, kPag | N/A     | --- | 7000.00 | --- |
| Pres Ratio F/F        | 2.845   | --- | 2.932   | --- |
| Temp Suct, °C         | 25.00   | --- | 48.89   | --- |
| Temp Clr Disch, °C    | 48.89   | --- | 43.33   | --- |

#### Cylinder Data:

#### Throw 2

#### Throw 4

#### Throw 1

#### Throw 3

|                        | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
|------------------------|------------|------------|------------|------------|
| Cyl Model              | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
| Cyl Bore, in           | 4.750      | 4.750      | 3.000      | 3.000      |
| Cyl RDP (API), kPag    | 5421.8     | 5421.8     | 15983.3    | 15983.3    |
| Cyl MAWP, kPag         | 5964.0     | 5964.0     | 17581.6    | 17581.6    |
| Cyl Action             | DBL        | DBL        | DBL        | DBL        |
| Cyl Disp, CFM          | 107.6      | 107.6      | 41.1       | 41.1       |
| Pres Suct Intl, kPag   | 748.31     | 748.31     | 2260.12    | 2260.12    |
| Temp Suct Intl, °C     | 27         | 27         | 51         | 51         |
| Suct Zsph              | 0.9708     | 0.9708     | 0.9379     | 0.9379     |
| Pres Disch Intl, kPag  | 2522.76    | 2522.76    | 7329.05    | 7329.05    |
| Temp Disch Intl, °C    | 104        | 104        | 136        | 136        |
| HE Suct Gas Vel, FPM   | 6961       | 6961       | 6648       | 6648       |
| HE Disch Gas Vel, FPM  | 6311       | 6311       | 5931       | 5931       |
| HE Spcra Used/Max      | 0/2        | 0/2        | 0/1        | 0/1        |
| HE Vol Pkt Avail, %    | 1.17+53.15 | 1.17+53.15 | 0.61+42.12 | 0.61+42.12 |
| Vol Pkt Used, %        | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   |
| HE Min Clr, %          | 18.77      | 18.77      | 18.29      | 18.29      |
| HE Total Clr, %        | 19.95      | 19.95      | 18.89      | 18.89      |
| CE Suct Gas Vel, FPM   | 6571       | 6571       | 5714       | 5714       |
| CE Disch Gas Vel, FPM  | 5957       | 5957       | 5097       | 5097       |
| CE Spcra Used/Max      | 0/2        | 0/2        | 0/1        | 0/1        |
| CE Min Clr, %          | 20.36      | 20.36      | 22.17      | 22.17      |
| CE Total Clr, %        | 20.36      | 20.36      | 22.17      | 22.17      |
| Suct Vol Eff HE/CE, %  | 67.1/66.6  | 67.1/66.6  | 67.6/63.2  | 67.6/63.2  |
| Disch Event HE/CE, ms  | 5.6/6.5    | 5.6/6.5    | 5.6/6.2    | 5.6/6.2    |
| Suct Pseudo-Q HE/CE    | 5.3/4.7    | 5.3/4.7    | 4.4/3.3    | 4.4/3.3    |
| Gas Rod Ld Comp, lbf   | 4679 C     | 4679 C     | 5549 C     | 5549 C     |
| Gas Rod Ld Tens, lbf   | 4187 T     | 4187 T     | 4121 T     | 4121 T     |
| Gas Rod Ld Total, lbf  | 8866       | 8866       | 9670       | 9670       |
| Xhd Pin Deg/%RvrsI lbf | 143/74.0   | 143/74.0   | 176/52.6   | 176/52.6   |
| Flow Calc, E3m3/D      | 25.062     | 25.062     | 25.062     | 25.062     |
| Cyl BHP                | 53.5       | 53.5       | 56.5       | 56.5       |





### Ariel Performance

Company: Collicutt Energy Services

Customer: BP Canada

Quote:

Inquiry: 05-25

7.5.5

Case 13:

Project: FH587



#### Compressor Data:

|                  |               |                   |        |                   |              |
|------------------|---------------|-------------------|--------|-------------------|--------------|
| Elevation, ft:   | <u>4921.3</u> | Barmtr, kPaa:     | 84.389 | Ambient, °C:      | <u>38.00</u> |
| Frame:           | JGA/4         | Stroke, in:       | 3.00   | Rod Dia, in:      | 1.125        |
| Max RL Tot, lbf: | 20000         | Max RL Tens, lbf: | 10000  | Max RL Comp, lbf: | 11000        |
| Rated RPM:       | 1800          | Rated BHP:        | 560.0  | Rated PS FPM:     | 900.0        |
| Calc RPM:        | 1800.0        | Calc BHP:         | 248    | Calc PS FPM:      | 900.0        |

#### Driver Data:

|        |           |
|--------|-----------|
| Type:  | Nat. Gas  |
| Mfg:   | Waukesha  |
| Model: | F18GL/GLD |
| BHP:   | 400       |
| Avail: | 375 (25)  |

#### Services

##### Stage Data:

|                       | Service 1<br>#1 |     | #2      |     |
|-----------------------|-----------------|-----|---------|-----|
| Flow Req'd, E3m3/D    | 75.000          | --- | 75.000  | --- |
| Flow Calc, E3m3/D     | 57.026          | --- | 57.026  | --- |
| Cyl BHP per Stage     | 117.7           | --- | 118.7   | --- |
| Specific Gravity      | 0.7059          | --- | 0.7059  | --- |
| Ratio of Sp Ht (N)    | 1.2500          | --- | 1.2534  | --- |
| Comp Suct (Zs)        | 0.9667          | --- | 0.9315  | --- |
| Comp Disch (Zd)       | 0.9556          | --- | 0.9248  | --- |
| Pres Suct Line, kPag  | 900.00          | --- | N/A     | --- |
| Pres Suct Flg, kPag   | 890.16          | --- | 2550.98 | --- |
| Pres Disch Flg, kPag  | 2604.06         | --- | 7070.84 | --- |
| Pres Disch Line, kPag | N/A             | --- | 7000.00 | --- |
| Pres Ratio F/F        | 2.759           | --- | 2.715   | --- |
| Temp Suct, °C         | 25.00           | --- | 48.89   | --- |
| Temp Clr Disch, °C    | 48.89           | --- | 43.33   | --- |

##### Cylinder Data:

|                        | Throw 2    | Throw 4    | Throw 1    | Throw 3    |
|------------------------|------------|------------|------------|------------|
| Cyl Model              | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
| Cyl Bore, in           | 4.750      | 4.750      | 3.000      | 3.000      |
| Cyl RDP (API), kPag    | 5421.8     | 5421.8     | 15983.3    | 15983.3    |
| Cyl MAWP, kPag         | 5964.0     | 5964.0     | 17581.6    | 17581.6    |
| Cyl Action             | DBL        | DBL        | DBL        | DBL        |
| Cyl Disp, CFM          | 107.6      | 107.6      | 41.1       | 41.1       |
| Pres Suct Intl, kPag   | 842.29     | 842.29     | 2446.57    | 2446.57    |
| Temp Suct Intl, °C     | 27         | 27         | 51         | 51         |
| Suct Zsph              | 0.9675     | 0.9675     | 0.9330     | 0.9330     |
| Pres Disch Intl, kPag  | 2730.60    | 2730.60    | 7333.98    | 7333.98    |
| Temp Disch Intl, °C    | 102        | 102        | 130        | 130        |
| HE Suct Gas Vel, FPM   | 6961       | 6961       | 6648       | 6648       |
| HE Disch Gas Vel, FPM  | 6311       | 6311       | 5931       | 5931       |
| HE Spcrrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| HE Vol Pkt Avail, %    | 1.17+53.15 | 1.17+53.15 | 0.61+42.12 | 0.61+42.12 |
| Vol Pkt Used, %        | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   |
| HE Min Clr, %          | 18.77      | 18.77      | 18.29      | 18.29      |
| HE Total Clr, %        | 19.95      | 19.95      | 18.89      | 18.89      |
| CE Suct Gas Vel, FPM   | 6571       | 6571       | 5714       | 5714       |
| CE Disch Gas Vel, FPM  | 5957       | 5957       | 5097       | 5097       |
| CE Spcrrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| CE Min Clr, %          | 20.36      | 20.36      | 22.17      | 22.17      |
| CE Total Clr, %        | 20.36      | 20.36      | 22.17      | 22.17      |
| Suct Vol Eff HE/CE, %  | 68.4/67.9  | 68.4/67.9  | 70.5/66.6  | 70.5/66.6  |
| Disch Event HE/CE, ms  | 5.7/6.7    | 5.7/6.7    | 5.9/6.6    | 5.9/6.6    |
| Suct Pseudo-Q HE/CE    | 5.3/4.7    | 5.3/4.7    | 4.4/3.3    | 4.4/3.3    |
| Gas Rod Ld Comp, lbf   | 4986 C     | 4986 C     | 5389 C     | 5389 C     |
| Gas Rod Ld Tens, lbf   | 4449 T     | 4449 T     | 3935 T     | 3935 T     |
| Gas Rod Ld Total, lbf  | 9435       | 9435       | 9324       | 9324       |
| Xhd Pin Deg/%RvrsI lbf | 145/74.9   | 145/74.9   | 176/52.3   | 176/52.3   |
| Flow Calc, E3m3/D      | 28.513     | 28.513     | 28.513     | 28.513     |
| Cyl BHP                | 58.9       | 58.9       | 59.3       | 59.3       |





# Ariel Performance

Company: Collicutt Energy Services

Customer: BP Canada

Quote:

Inquiry: 05-25

7.5.5

Case 14:

Project: FH587



### Compressor Data:

|                  |               |                   |        |                   |              |
|------------------|---------------|-------------------|--------|-------------------|--------------|
| Elevation, ft:   | <u>4921.3</u> | Barmtr, kPaa:     | 84.389 | Ambient, °C:      | <u>38.00</u> |
| Frame:           | JGA/4         | Stroke, in:       | 3.00   | Rod Dia, in:      | 1.125        |
| Max RL Tot, lbf: | 20000         | Max RL Tens, lbf: | 10000  | Max RL Comp, lbf: | 11000        |
| Rated RPM:       | 1800          | Rated BHP:        | 560.0  | Rated PS FPM:     | 900.0        |
| Calc RPM:        | 1800.0        | Calc BHP:         | 263    | Calc PS FPM:      | 900.0        |

### Driver Data:

|        |           |
|--------|-----------|
| Type:  | Nat. Gas  |
| Mfg:   | Waukesha  |
| Model: | F18GL/GLD |
| BHP:   | 400       |
| Avail: | 375 (25)  |

### Services

#### Service 1

#### Stage Data:

##### #1

|                       |         |
|-----------------------|---------|
| Flow Req'd, E3m3/D    | 75.000  |
| Flow Calc, E3m3/D     | 63.995  |
| Cyl BHP per Stage     | 128.3   |
| Specific Gravity      | 0.7059  |
| Ratio of Sp Ht (N)    | 1.2516  |
| Comp Suct (Zs)        | 0.9633  |
| Comp Disch (Zd)       | 0.9518  |
| Pres Suct Line, kPag  | 1000.00 |
| Pres Suct Flg, kPag   | 989.16  |
| Pres Disch Flg, kPag  | 2800.48 |
| Pres Disch Line, kPag | N/A     |
| Pres Ratio F/F        | 2.687   |
| Temp Suct, °C         | 25.00   |
| Temp Clr Disch, °C    | 48.89   |

##### #2

|                       |         |
|-----------------------|---------|
| Flow Req'd, E3m3/D    | 75.000  |
| Flow Calc, E3m3/D     | 63.995  |
| Cyl BHP per Stage     | 123.0   |
| Specific Gravity      | 0.7059  |
| Ratio of Sp Ht (N)    | 1.2556  |
| Comp Suct (Zs)        | 0.9267  |
| Comp Disch (Zd)       | 0.9205  |
| Pres Suct Line, kPag  | N/A     |
| Pres Suct Flg, kPag   | 2744.76 |
| Pres Disch Flg, kPag  | 7070.84 |
| Pres Disch Line, kPag | 7000.00 |
| Pres Ratio F/F        | 2.529   |
| Temp Suct, °C         | 48.89   |
| Temp Clr Disch, °C    | 43.33   |

#### Cylinder Data:

##### Throw 2

##### Throw 4

##### Throw 1

##### Throw 3

|                        |            |            |            |            |
|------------------------|------------|------------|------------|------------|
| Cyl Model              | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
| Cyl Bore, in           | 4.750      | 4.750      | 3.000      | 3.000      |
| Cyl RDP (API), kPag    | 5421.8     | 5421.8     | 15983.3    | 15983.3    |
| Cyl MAWP, kPag         | 5964.0     | 5964.0     | 17581.6    | 17581.6    |
| Cyl Action             | DBL        | DBL        | DBL        | DBL        |
| Cyl Disp, CFM          | 107.6      | 107.6      | 41.1       | 41.1       |
| Pres Suct Intl, kPag   | 936.24     | 936.24     | 2632.04    | 2632.04    |
| Temp Suct Intl, °C     | 27         | 27         | 51         | 51         |
| Suct Zsph              | 0.9642     | 0.9642     | 0.9282     | 0.9282     |
| Pres Disch Intl, kPag  | 2937.37    | 2937.37    | 7338.73    | 7338.73    |
| Temp Disch Intl, °C    | 100        | 100        | 125        | 125        |
| HE Suct Gas Vel, FPM   | 6961       | 6961       | 6648       | 6648       |
| HE Disch Gas Vel, FPM  | 6311       | 6311       | 5931       | 5931       |
| HE Spcrrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| HE Vol Pkt Avail, %    | 1.17+53.15 | 1.17+53.15 | 0.61+42.12 | 0.61+42.12 |
| Vol Pkt Used, %        | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   |
| HE Min Clr, %          | 18.77      | 18.77      | 18.29      | 18.29      |
| HE Total Clr, %        | 19.95      | 19.95      | 18.89      | 18.89      |
| CE Suct Gas Vel, FPM   | 6571       | 6571       | 5714       | 5714       |
| CE Disch Gas Vel, FPM  | 5957       | 5957       | 5097       | 5097       |
| CE Spcrrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| CE Min Clr, %          | 20.36      | 20.36      | 22.17      | 22.17      |
| CE Total Clr, %        | 20.36      | 20.36      | 22.17      | 22.17      |
| Suct Vol Eff HE/CE, %  | 69.4/68.9  | 69.4/68.9  | 73.1/69.5  | 73.1/69.5  |
| Disch Event HE/CE, ms  | 5.9/6.8    | 5.9/6.8    | 6.3/7.0    | 6.3/7.0    |
| Suct Pseudo-Q HE/CE    | 5.3/4.7    | 5.3/4.7    | 4.5/3.3    | 4.5/3.3    |
| Gas Rod Ld Comp, lbf   | 5290 C     | 5290 C     | 5230 C     | 5230 C     |
| Gas Rod Ld Tens, lbf   | 4708 T     | 4708 T     | 3749 T     | 3749 T     |
| Gas Rod Ld Total, lbf  | 9998       | 9998       | 8979       | 8979       |
| Xhd Pin Deg/%RvrsI lbf | 149/75.3   | 149/75.3   | 170/55.1   | 170/55.1   |
| Flow Calc, E3m3/D      | 31.997     | 31.997     | 31.998     | 31.998     |
| Cyl BHP                | 64.2       | 64.2       | 61.5       | 61.5       |





# Ariel Performance

Company: Collicutt Energy Services

Customer: BP Canada

Quote:

Inquiry: 05-25

7.5.5 Case 15:

Project: FH587



## Compressor Data:

|                  |               |                   |        |                   |              |
|------------------|---------------|-------------------|--------|-------------------|--------------|
| Elevation, ft:   | <u>4921.3</u> | Barmtr, kPaa:     | 84.389 | Ambient, °C:      | <u>38.00</u> |
| Frame:           | JGA/4         | Stroke, in:       | 3.00   | Rod Dia, in:      | 1.125        |
| Max RL Tot, lbf: | 20000         | Max RL Tens, lbf: | 10000  | Max RL Comp, lbf: | 11000        |
| Rated RPM:       | 1800          | Rated BHP:        | 560.0  | Rated PS FPM:     | 900.0        |
| Calc RPM:        | 1800.0        | Calc BHP:         | 277    | Calc PS FPM:      | 900.0        |

## Driver Data:

|        |           |
|--------|-----------|
| Type:  | Nat. Gas  |
| Mfg:   | Waukesha  |
| Model: | F18GL/GLD |
| BHP:   | 400       |
| Avail: | 375 (25)  |

## Services

### Stage Data:

|                       | Service 1<br>#1 |     | #2      |     |
|-----------------------|-----------------|-----|---------|-----|
| Flow Req'd, E3m3/D    | 75.000          | --- | 75.000  | --- |
| Flow Calc, E3m3/D     | 71.029          | --- | 71.029  | --- |
| Cyl BHP per Stage     | 138.8           | --- | 126.2   | --- |
| Specific Gravity      | 0.7059          | --- | 0.7059  | --- |
| Ratio of Sp Ht (N)    | 1.2531          | --- | 1.2577  | --- |
| Comp Suct (Zs)        | 0.9599          | --- | 0.9219  | --- |
| Comp Disch (Zd)       | 0.9481          | --- | 0.9162  | --- |
| Pres Suct Line, kPag  | 1100.00         | --- | N/A     | --- |
| Pres Suct Flg, kPag   | 1088.16         | --- | 2937.68 | --- |
| Pres Disch Flg, kPag  | 2995.90         | --- | 7070.84 | --- |
| Pres Disch Line, kPag | N/A             | --- | 7000.00 | --- |
| Pres Ratio F/F        | 2.627           | --- | 2.368   | --- |
| Temp Suct, °C         | 25.00           | --- | 48.89   | --- |
| Temp Clr Disch, °C    | 48.89           | --- | 43.33   | --- |

### Cylinder Data:

|                         | Throw 2    | Throw 4    | Throw 1    | Throw 3    |
|-------------------------|------------|------------|------------|------------|
| Cyl Model               | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
| Cyl Bore, in            | 4.750      | 4.750      | 3.000      | 3.000      |
| Cyl RDP (API), kPag     | 5421.8     | 5421.8     | 15983.3    | 15983.3    |
| Cyl MAWP, kPag          | 5964.0     | 5964.0     | 17581.6    | 17581.6    |
| Cyl Action              | DBL        | DBL        | DBL        | DBL        |
| Disp, CFM               | 107.6      | 107.6      | 41.1       | 41.1       |
| Pres Suct Intl, kPag    | 1030.14    | 1030.14    | 2816.60    | 2816.60    |
| Temp Suct Intl, °C      | 27         | 27         | 51         | 51         |
| Suct Zsph               | 0.9609     | 0.9609     | 0.9235     | 0.9235     |
| Pres Disch Intl, kPag   | 3143.17    | 3143.17    | 7343.33    | 7343.33    |
| Temp Disch Intl, °C     | 99         | 99         | 120        | 120        |
| HE Suct Gas Vel, FPM    | 6961       | 6961       | 6648       | 6648       |
| HE Disch Gas Vel, FPM   | 6311       | 6311       | 5931       | 5931       |
| HE Spcrrs Used/Max      | 0/2        | 0/2        | 0/1        | 0/1        |
| HE Vol Pkt Avail, %     | 1.17+53.15 | 1.17+53.15 | 0.61+42.12 | 0.61+42.12 |
| Vol Pkt Used, %         | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   |
| HE Min Clr, %           | 18.77      | 18.77      | 18.29      | 18.29      |
| HE Total Clr, %         | 19.95      | 19.95      | 18.89      | 18.89      |
| CE Suct Gas Vel, FPM    | 6571       | 6571       | 5714       | 5714       |
| CE Disch Gas Vel, FPM   | 5957       | 5957       | 5097       | 5097       |
| CE Spcrrs Used/Max      | 0/2        | 0/2        | 0/1        | 0/1        |
| CE Min Clr, %           | 20.36      | 20.36      | 22.17      | 22.17      |
| CE Total Clr, %         | 20.36      | 20.36      | 22.17      | 22.17      |
| Suct Vol Eff HE/CE, %   | 70.3/69.8  | 70.3/69.8  | 75.3/72.1  | 75.3/72.1  |
| Disch Event HE/CE, ms   | 6.0/6.9    | 6.0/6.9    | 6.6/7.3    | 6.6/7.3    |
| Suct Pseudo-Q HE/CE     | 5.3/4.7    | 5.3/4.7    | 4.5/3.3    | 4.5/3.3    |
| Gas Rod Ld Comp, lbf    | 5592 C     | 5592 C     | 5072 C     | 5072 C     |
| Gas Rod Ld Tens, lbf    | 4966 T     | 4966 T     | 3565 T     | 3565 T     |
| Gas Rod Ld Total, lbf   | 10558      | 10558      | 8637       | 8637       |
| Xhd Pin Deg/%Rvrrsl lbf | 164/76.0   | 164/76.0   | 172/57.3   | 172/57.3   |
| Flow Calc, E3m3/D       | 35.515     | 35.515     | 35.515     | 35.515     |
| Cyl BHP                 | 69.4       | 69.4       | 63.1       | 63.1       |





# Ariel Performance



Company: Collicutt Energy Services

Customer: BP Canada

Quote:

Inquiry: 05-25

7.5.5 Case 16:

Project: FH587

### Compressor Data:

|                  |               |                   |        |                   |              |
|------------------|---------------|-------------------|--------|-------------------|--------------|
| Elevation, ft:   | <u>4921.3</u> | Barmtr, kPaa:     | 84.389 | Ambient, °C:      | <u>38.00</u> |
| Frame:           | JGA/4         | Stroke, in:       | 3.00   | Rod Dia, in:      | 1.125        |
| Max RL Tot, lbf: | 20000         | Max RL Tens, lbf: | 10000  | Max RL Comp, lbf: | 11000        |
| Rated RPM:       | 1800          | Rated BHP:        | 560.0  | Rated PS FPM:     | 900.0        |
| Calc RPM:        | 1800.0        | Calc BHP:         | 290    | Calc PS FPM:      | 900.0        |

### Driver Data:

|        |           |
|--------|-----------|
| Type:  | Nat. Gas  |
| Mfg:   | Waukesha  |
| Model: | F18GL/GLD |
| BHP:   | 400       |
| Avail: | 375 (25)  |

### Services

#### Service 1

#### Stage Data:

|                       | #1      |     | #2      |     |
|-----------------------|---------|-----|---------|-----|
| Flow Req'd, E3m3/D    | 75.000  | --- | 75.000  | --- |
| Flow Calc, E3m3/D     | 78.128  | --- | 78.128  | --- |
| Cyl BHP per Stage     | 149.1   | --- | 128.4   | --- |
| Specific Gravity      | 0.7059  | --- | 0.7059  | --- |
| Ratio of Sp Ht (N)    | 1.2546  | --- | 1.2598  | --- |
| Comp Suct (Zs)        | 0.9566  | --- | 0.9172  | --- |
| Comp Disch (Zd)       | 0.9445  | --- | 0.9120  | --- |
| Pres Suct Line, kPag  | 1200.00 | --- | N/A     | --- |
| Pres Suct Flg, kPag   | 1187.16 | --- | 3129.83 | --- |
| Pres Disch Flg, kPag  | 3190.46 | --- | 7070.84 | --- |
| Pres Disch Line, kPag | N/A     | --- | 7000.00 | --- |
| Pres Ratio F/F        | 2.575   | --- | 2.226   | --- |
| Temp Suct, °C         | 25.00   | --- | 48.89   | --- |
| Temp Clr Disch, °C    | 48.89   | --- | 43.33   | --- |

#### Cylinder Data:

#### Throw 2

#### Throw 4

#### Throw 1

#### Throw 3

|                        | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
|------------------------|------------|------------|------------|------------|
| Cyl Model              | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
| Cyl Bore, in           | 4.750      | 4.750      | 3.000      | 3.000      |
| Cyl RDP (API), kPag    | 5421.8     | 5421.8     | 15983.3    | 15983.3    |
| Cyl MAWP, kPag         | 5964.0     | 5964.0     | 17581.6    | 17581.6    |
| Cyl Action             | DBL        | DBL        | DBL        | DBL        |
| Cyl Disp, CFM          | 107.6      | 107.6      | 41.1       | 41.1       |
| Pres Suct Intl, kPag   | 1124.02    | 1124.02    | 3000.34    | 3000.34    |
| Temp Suct Intl, °C     | 27         | 27         | 51         | 51         |
| Suct Zsph              | 0.9576     | 0.9576     | 0.9188     | 0.9188     |
| Pres Disch Intl, kPag  | 3348.12    | 3348.12    | 7347.81    | 7347.81    |
| Temp Disch Intl, °C    | 98         | 98         | 115        | 115        |
| HE Suct Gas Vel, FPM   | 6961       | 6961       | 6648       | 6648       |
| HE Disch Gas Vel, FPM  | 6311       | 6311       | 5931       | 5931       |
| HE Spcrs Used/Max      | 0/2        | 0/2        | 0/1        | 0/1        |
| HE Vol Pkt Avail, %    | 1.17+53.15 | 1.17+53.15 | 0.61+42.12 | 0.61+42.12 |
| Vol Pkt Used, %        | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   |
| HE Min Clr, %          | 18.77      | 18.77      | 18.29      | 18.29      |
| HE Total Clr, %        | 19.95      | 19.95      | 18.89      | 18.89      |
| CE Suct Gas Vel, FPM   | 6571       | 6571       | 5714       | 5714       |
| CE Disch Gas Vel, FPM  | 5957       | 5957       | 5097       | 5097       |
| CE Spcrs Used/Max      | 0/2        | 0/2        | 0/1        | 0/1        |
| CE Min Clr, %          | 20.36      | 20.36      | 22.17      | 22.17      |
| CE Total Clr, %        | 20.36      | 20.36      | 22.17      | 22.17      |
| Suct Vol Eff HE/CE, %  | 71.0/70.5  | 71.0/70.5  | 77.2/74.4  | 77.2/74.4  |
| Disch Event HE/CE, ms  | 6.1/6.9    | 6.1/6.9    | 6.9/7.7    | 6.9/7.7    |
| Suct Pseudo-Q HE/CE    | 5.3/4.8    | 5.3/4.8    | 4.5/3.3    | 4.5/3.3    |
| Gas Rod Ld Comp, lbf   | 5892 C     | 5892 C     | 4914 C     | 4914 C     |
| Gas Rod Ld Tens, lbf   | 5221 T     | 5221 T     | 3381 T     | 3381 T     |
| Gas Rod Ld Total, lbf  | 11113      | 11113      | 8295       | 8295       |
| Xhd Pin Deg/%Rvrsl lbf | 168/76.2   | 168/76.2   | 166/59.3   | 166/59.3   |
| Flow Calc, E3m3/D      | 39.064     | 39.064     | 39.064     | 39.064     |
| Cyl BHP                | 74.5       | 74.5       | 64.2       | 64.2       |





### Ariel Performance

Company: Collicutt Energy Services

Customer: BP Canada

Quote:

Inquiry: 05-25

7.5.5 Case 17:

Project: FH587



#### Compressor Data:

|                  |               |                   |        |                   |              |
|------------------|---------------|-------------------|--------|-------------------|--------------|
| Elevation, ft:   | <u>4921.3</u> | Barmtr, kPaa:     | 84.389 | Ambient, °C:      | <u>38.00</u> |
| Frame:           | JGA/4         | Stroke, in:       | 3.00   | Rod Dia, in:      | 1.125        |
| Max RL Tot, lbf: | 20000         | Max RL Tens, lbf: | 10000  | Max RL Comp, lbf: | 11000        |
| Rated RPM:       | 1800          | Rated BHP:        | 560.0  | Rated PS FPM:     | 900.0        |
| Calc RPM:        | 1800.0        | Calc BHP:         | 301    | Calc PS FPM:      | 900.0        |

#### Driver Data:

|        |           |
|--------|-----------|
| Type:  | Nat. Gas  |
| Mfg:   | Waukesha  |
| Model: | F18GL/GLD |
| BHP:   | 400       |
| Avail: | 375 (25)  |

#### Services

##### Stage Data:

|                       | Service 1 #1 |     | #2      |     |
|-----------------------|--------------|-----|---------|-----|
| Flow Req'd, E3m3/D    | 75.000       | --- | 75.000  | --- |
| Flow Calc, E3m3/D     | 85.291       | --- | 85.291  | --- |
| Cyl BHP per Stage     | 159.3        | --- | 129.7   | --- |
| Specific Gravity      | 0.7059       | --- | 0.7059  | --- |
| Ratio of Sp Ht (N)    | 1.2560       | --- | 1.2617  | --- |
| Comp Suct (Zs)        | 0.9532       | --- | 0.9126  | --- |
| Comp Disch (Zd)       | 0.9409       | --- | 0.9079  | --- |
| Pres Suct Line, kPag  | 1300.00      | --- | N/A     | --- |
| Pres Suct Flg, kPag   | 1286.16      | --- | 3321.26 | --- |
| Pres Disch Flg, kPag  | 3384.21      | --- | 7070.84 | --- |
| Pres Disch Line, kPag | N/A          | --- | 7000.00 | --- |
| Pres Ratio F/F        | 2.531        | --- | 2.101   | --- |
| Temp Suct, °C         | 25.00        | --- | 48.89   | --- |
| Temp Clr Disch, °C    | 48.89        | --- | 43.33   | --- |

##### Cylinder Data:

|                        | Throw 2    | Throw 4    | Throw 1    | Throw 3    |
|------------------------|------------|------------|------------|------------|
| Cyl Model              | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
| Cyl Bore, in           | 4.750      | 4.750      | 3.000      | 3.000      |
| Cyl RDP (API), kPag    | 5421.8     | 5421.8     | 15983.3    | 15983.3    |
| Cyl MAWP, kPag         | 5964.0     | 5964.0     | 17581.6    | 17581.6    |
| Cyl Action             | DBL        | DBL        | DBL        | DBL        |
| Disp, CFM              | 107.6      | 107.6      | 41.1       | 41.1       |
| Pres Suct Intl, kPag   | 1217.85    | 1217.85    | 3183.31    | 3183.31    |
| Temp Suct Intl, °C     | 27         | 27         | 50         | 50         |
| Suct Zsph              | 0.9543     | 0.9543     | 0.9141     | 0.9141     |
| Pres Disch Intl, kPag  | 3552.28    | 3552.28    | 7352.17    | 7352.17    |
| Temp Disch Intl, °C    | 97         | 97         | 111        | 111        |
| HE Suct Gas Vel, FPM   | 6961       | 6961       | 6648       | 6648       |
| HE Disch Gas Vel, FPM  | 6311       | 6311       | 5931       | 5931       |
| HE Spcrrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| HE Vol Pkt Avail, %    | 1.17+53.15 | 1.17+53.15 | 0.61+42.12 | 0.61+42.12 |
| Vol Pkt Used, %        | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   |
| HE Min Clr, %          | 18.77      | 18.77      | 18.29      | 18.29      |
| HE Total Clr, %        | 19.95      | 19.95      | 18.89      | 18.89      |
| CE Suct Gas Vel, FPM   | 6571       | 6571       | 5714       | 5714       |
| CE Disch Gas Vel, FPM  | 5957       | 5957       | 5097       | 5097       |
| CE Spcrrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| CE Min Clr, %          | 20.36      | 20.36      | 22.17      | 22.17      |
| CE Total Clr, %        | 20.36      | 20.36      | 22.17      | 22.17      |
| Suct Vol Eff HE/CE, %  | 71.6/71.2  | 71.6/71.2  | 79.0/76.4  | 79.0/76.4  |
| Disch Event HE/CE, ms  | 6.2/7.0    | 6.2/7.0    | 7.2/8.1    | 7.2/8.1    |
| Suct Pseudo-Q HE/CE    | 5.4/4.8    | 5.4/4.8    | 4.5/3.4    | 4.5/3.4    |
| Gas Rod Ld Comp, lbf   | 6190 C     | 6190 C     | 4757 C     | 4757 C     |
| Gas Rod Ld Tens, lbf   | 5474 T     | 5474 T     | 3198 T     | 3198 T     |
| Gas Rod Ld Total, lbf  | 11664      | 11664      | 7955       | 7955       |
| Xhd Pin Deg/%Rvrsl lbf | 170/76.5   | 170/76.5   | 163/60.7   | 163/60.7   |
| Flow Calc, E3m3/D      | 42.646     | 42.646     | 42.645     | 42.645     |
| Cyl BHP                | 79.6       | 79.6       | 64.9       | 64.9       |





### Ariel Performance

Company: Collicutt Energy Services

Customer: BP Canada

Quote:

Inquiry: 05-25

7.5.5 Case 18:

Project: FH587



#### Compressor Data:

|                  |               |                   |        |                   |              |
|------------------|---------------|-------------------|--------|-------------------|--------------|
| Elevation, ft:   | <u>4921.3</u> | Barmtr, kPaa:     | 84.389 | Ambient, °C:      | <u>38.00</u> |
| Frame:           | JGA/4         | Stroke, in:       | 3.00   | Rod Dia, in:      | 1.125        |
| Max RL Tot, lbf: | 20000         | Max RL Tens, lbf: | 10000  | Max RL Comp, lbf: | 11000        |
| Rated RPM:       | 1800          | Rated BHP:        | 560.0  | Rated PS FPM:     | 900.0        |
| Calc RPM:        | 1800.0        | Calc BHP:         | 312    | Calc PS FPM:      | 900.0        |

#### Driver Data:

|        |           |
|--------|-----------|
| Type:  | Nat. Gas  |
| Mfg:   | Waukesha  |
| Model: | F18GL/GLD |
| BHP:   | 400       |
| Avail: | 375 (25)  |

#### Services

#### Service 1

##### Stage Data:

##### #1

##### #2

|                       |         |     |         |     |
|-----------------------|---------|-----|---------|-----|
| Flow Req'd, E3m3/D    | 75.000  | --- | 75.000  | --- |
| Flow Calc, E3m3/D     | 92.518  | --- | 92.518  | --- |
| Cyl BHP per Stage     | 169.4   | --- | 130.2   | --- |
| Specific Gravity      | 0.7060  | --- | 0.7060  | --- |
| Ratio of Sp Ht (N)    | 1.2574  | --- | 1.2636  | --- |
| Comp Suct (Zs)        | 0.9499  | --- | 0.9080  | --- |
| Comp Disch (Zd)       | 0.9373  | --- | 0.9039  | --- |
| Pres Suct Line, kPag  | 1400.00 | --- | N/A     | --- |
| Pres Suct Flg, kPag   | 1385.16 | --- | 3512.05 | --- |
| Pres Disch Flg, kPag  | 3577.23 | --- | 7070.84 | --- |
| Pres Disch Line, kPag | N/A     | --- | 7000.00 | --- |
| Pres Ratio F/F        | 2.492   | --- | 1.990   | --- |
| Temp Suct, °C         | 25.00   | --- | 48.89   | --- |
| Temp Clr Disch, °C    | 48.89   | --- | 43.33   | --- |

##### Cylinder Data:

##### Throw 2

##### Throw 4

##### Throw 1

##### Throw 3

|                        |            |            |            |            |
|------------------------|------------|------------|------------|------------|
| Cyl Model              | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
| Cyl Bore, in           | 4.750      | 4.750      | 3.000      | 3.000      |
| Cyl RDP (API), kPag    | 5421.8     | 5421.8     | 15983.3    | 15983.3    |
| Cyl MAWP, kPag         | 5964.0     | 5964.0     | 17581.6    | 17581.6    |
| Cyl Action             | DBL        | DBL        | DBL        | DBL        |
| Cyl Disp, CFM          | 107.6      | 107.6      | 41.1       | 41.1       |
| Pres Suct Intl, kPag   | 1311.65    | 1311.65    | 3365.59    | 3365.59    |
| Temp Suct Intl, °C     | 27         | 27         | 50         | 50         |
| Suct Zsph              | 0.9510     | 0.9510     | 0.9095     | 0.9095     |
| Pres Disch Intl, kPag  | 3755.73    | 3755.73    | 7356.44    | 7356.44    |
| Temp Disch Intl, °C    | 96         | 96         | 107        | 107        |
| HE Suct Gas Vel, FPM   | 6961       | 6961       | 6648       | 6648       |
| HE Disch Gas Vel, FPM  | 6311       | 6311       | 5931       | 5931       |
| HE Spcrs Used/Max      | 0/2        | 0/2        | 0/1        | 0/1        |
| HE Vol Pkt Avail, %    | 1.17+53.15 | 1.17+53.15 | 0.61+42.12 | 0.61+42.12 |
| Vol Pkt Used, %        | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   |
| HE Min Clr, %          | 18.77      | 18.77      | 18.29      | 18.29      |
| HE Total Clr, %        | 19.95      | 19.95      | 18.89      | 18.89      |
| CE Suct Gas Vel, FPM   | 6571       | 6571       | 5714       | 5714       |
| CE Disch Gas Vel, FPM  | 5957       | 5957       | 5097       | 5097       |
| CE Spcrs Used/Max      | 0/2        | 0/2        | 0/1        | 0/1        |
| CE Min Clr, %          | 20.36      | 20.36      | 22.17      | 22.17      |
| CE Total Clr, %        | 20.36      | 20.36      | 22.17      | 22.17      |
| Suct Vol Eff HE/CE, %  | 72.2/71.8  | 72.2/71.8  | 80.6/78.2  | 80.6/78.2  |
| Disch Event HE/CE, ms  | 6.3/7.1    | 6.3/7.1    | 7.5/8.3    | 7.5/8.3    |
| Suct Pseudo-Q HE/CE    | 5.4/4.8    | 5.4/4.8    | 4.6/3.4    | 4.6/3.4    |
| Gas Rod Ld Comp, lbf   | 6486 C     | 6486 C     | 4600 C     | 4600 C     |
| Gas Rod Ld Tens, lbf   | 5726 T     | 5726 T     | 3016 T     | 3016 T     |
| Gas Rod Ld Total, lbf  | 12212      | 12212      | 7616       | 7616       |
| Xhd Pin Deg/%Rvrs/ lbf | 171/77.6   | 171/77.6   | 160/61.9   | 160/61.9   |
| Flow Calc, E3m3/D      | 46.259     | 46.259     | 46.259     | 46.259     |
| Cyl BHP                | 84.7       | 84.7       | 65.1       | 65.1       |





### Ariel Performance

Company: Collicutt Energy Services

Customer: BP Canada

Quote:

Inquiry: 05-25

7.5.5 Case 19:

Project: FH587



#### Compressor Data:

|                  |               |                   |        |                   |              |
|------------------|---------------|-------------------|--------|-------------------|--------------|
| Elevation, ft:   | <u>4921.3</u> | Barmtr, kPaa:     | 84.389 | Ambient, °C:      | <u>38.00</u> |
| Frame:           | JGA/4         | Stroke, in:       | 3.00   | Rod Dia, in:      | 1.125        |
| Max RL Tot, lbf: | 20000         | Max RL Tens, lbf: | 10000  | Max RL Comp, lbf: | 11000        |
| Rated RPM:       | 1800          | Rated BHP:        | 560.0  | Rated PS FPM:     | 900.0        |
| Calc RPM:        | 1800.0        | Calc BHP:         | 197    | Calc PS FPM:      | 900.0        |

#### Driver Data:

|        |           |
|--------|-----------|
| Type:  | Nat. Gas  |
| Mfg:   | Waukesha  |
| Model: | F18GL/GLD |
| BHP:   | 400       |
| Avail: | 375 (25)  |

#### Services

##### Stage Data:

|                       | Service 1<br>#1 |     | #2      |     |
|-----------------------|-----------------|-----|---------|-----|
| Flow Req'd, E3m3/D    | 75.000          | --- | 75.000  | --- |
| Flow Calc, E3m3/D     | 35.959          | --- | 35.959  | --- |
| Cyl BHP per Stage     | 85.1            | --- | 99.6    | --- |
| Specific Gravity      | 0.7058          | --- | 0.7058  | --- |
| Ratio of Sp Ht (N)    | 1.2446          | --- | 1.2459  | --- |
| Comp Suct (Zs)        | 0.9768          | --- | 0.9451  | --- |
| Comp Disch (Zd)       | 0.9672          | --- | 0.9382  | --- |
| Pres Suct Line, kPag  | 600.00          | --- | N/A     | --- |
| Pres Suct Flg, kPag   | 593.16          | --- | 2009.46 | --- |
| Pres Disch Flg, kPag  | 2055.26         | --- | 7575.84 | --- |
| Pres Disch Line, kPag | N/A             | --- | 7500.00 | --- |
| Pres Ratio F/F        | 3.158           | --- | 3.658   | --- |
| Temp Suct, °C         | 25.00           | --- | 48.89   | --- |
| Temp Clr Disch, °C    | 48.89           | --- | 43.33   | --- |

##### Cylinder Data:

|                        | Throw 2    | Throw 4    | Throw 1    | Throw 3    |
|------------------------|------------|------------|------------|------------|
| Cyl Model              | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
| Cyl Bore, in           | 4.750      | 4.750      | 3.000      | 3.000      |
| Cyl RDP (API), kPag    | 5421.8     | 5421.8     | 15983.3    | 15983.3    |
| Cyl MAWP, kPag         | 5964.0     | 5964.0     | 17581.6    | 17581.6    |
| Cyl Action             | DBL        | DBL        | DBL        | DBL        |
| Disp, CFM              | 107.6      | 107.6      | 41.1       | 41.1       |
| Pres Suct Intl, kPag   | 560.26     | 560.26     | 1927.87    | 1927.87    |
| Temp Suct Intl, °C     | 28         | 28         | 52         | 52         |
| Suct Zsph              | 0.9774     | 0.9774     | 0.9467     | 0.9467     |
| Pres Disch Intl, kPag  | 2152.47    | 2152.47    | 7838.65    | 7838.65    |
| Temp Disch Intl, °C    | 111        | 111        | 153        | 153        |
| HE Suct Gas Vel, FPM   | 6961       | 6961       | 6648       | 6648       |
| HE Disch Gas Vel, FPM  | 6311       | 6311       | 5931       | 5931       |
| HE Spcrrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| HE Vol Pkt Avail, %    | 1.17+53.15 | 1.17+53.15 | 0.61+42.12 | 0.61+42.12 |
| Vol Pkt Used, %        | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   |
| HE Min Clr, %          | 18.77      | 18.77      | 18.29      | 18.29      |
| HE Total Clr, %        | 19.95      | 19.95      | 18.89      | 18.89      |
| CE Suct Gas Vel, FPM   | 6571       | 6571       | 5714       | 5714       |
| CE Disch Gas Vel, FPM  | 5957       | 5957       | 5097       | 5097       |
| CE Spcrrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| CE Min Clr, %          | 20.36      | 20.36      | 22.17      | 22.17      |
| CE Total Clr, %        | 20.36      | 20.36      | 22.17      | 22.17      |
| Suct Vol Eff HE/CE, %  | 62.8/62.2  | 62.8/62.2  | 58.2/52.2  | 58.2/52.2  |
| Disch Event HE/CE, ms  | 5.2/5.9    | 5.2/5.9    | 4.6/5.1    | 4.6/5.1    |
| Suct Pseudo-Q HE/CE    | 5.2/4.6    | 5.2/4.6    | 4.4/3.2    | 4.4/3.2    |
| Gas Rod Ld Comp, lbf   | 4182 C     | 4182 C     | 6366 C     | 6366 C     |
| Gas Rod Ld Tens, lbf   | 3773 T     | 3773 T     | 4907 T     | 4907 T     |
| Gas Rod Ld Total, lbf  | 7955       | 7955       | 11273      | 11273      |
| Xhd Pin Deg/%Rvrsl lbf | 146/84.2   | 146/84.2   | 176/59.5   | 176/59.5   |
| Flow Calc, E3m3/D      | 17.979     | 17.979     | 17.979     | 17.979     |
| Cyl BHP                | 42.6       | 42.6       | 49.8       | 49.8       |





# Ariel Performance



Company: Collicutt Energy Services

Customer: BP Canada

Quote:

Inquiry: 05-25

7.5.5

Case 20:

Project: FH587

### Compressor Data:

|                  |               |                   |        |                   |              |
|------------------|---------------|-------------------|--------|-------------------|--------------|
| Elevation, ft:   | <u>4921.3</u> | Barmtr, kPaa:     | 84.389 | Ambient, °C:      | <u>38.00</u> |
| Frame:           | JGA/4         | Stroke, in:       | 3.00   | Rod Dia, in:      | 1.125        |
| Max RL Tot, lbf: | 20000         | Max RL Tens, lbf: | 10000  | Max RL Comp, lbf: | 11000        |
| Rated RPM:       | 1800          | Rated BHP:        | 560.0  | Rated PS FPM:     | 900.0        |
| Calc RPM:        | 1800.0        | Calc BHP:         | 218    | Calc PS FPM:      | 900.0        |

### Driver Data:

|        |           |
|--------|-----------|
| Type:  | Nat. Gas  |
| Mfg:   | Waukesha  |
| Model: | F18GL/GLD |
| BHP:   | 400       |
| Avail: | 375 (25)  |

### Services

#### Service 1

#### Stage Data:

|                       | #1      | --- | #2      | --- |
|-----------------------|---------|-----|---------|-----|
| Flow Req'd, E3m3/D    | 75.000  | --- | 75.000  | --- |
| Flow Calc, E3m3/D     | 42.711  | --- | 42.711  | --- |
| Cyl BHP per Stage     | 96.6    | --- | 109.2   | --- |
| Specific Gravity      | 0.7058  | --- | 0.7058  | --- |
| Ratio of Sp Ht (N)    | 1.2465  | --- | 1.2485  | --- |
| Comp Suct (Zs)        | 0.9734  | --- | 0.9401  | --- |
| Comp Disch (Zd)       | 0.9632  | --- | 0.9335  | --- |
| Pres Suct Line, kPag  | 700.00  | --- | N/A     | --- |
| Pres Suct Flg, kPag   | 692.16  | --- | 2206.50 | --- |
| Pres Disch Flg, kPag  | 2255.52 | --- | 7575.84 | --- |
| Pres Disch Line, kPag | N/A     | --- | 7500.00 | --- |
| Pres Ratio F/F        | 3.013   | --- | 3.344   | --- |
| Temp Suct, °C         | 25.00   | --- | 48.89   | --- |
| Temp Clr Disch, °C    | 48.89   | --- | 43.33   | --- |

#### Cylinder Data:

#### Throw 2

#### Throw 4

#### Throw 1

#### Throw 3

|                       | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
|-----------------------|------------|------------|------------|------------|
| Cyl Model             | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
| Cyl Bore, in          | 4.750      | 4.750      | 3.000      | 3.000      |
| Cyl RDP (API), kPag   | 5421.8     | 5421.8     | 15983.3    | 15983.3    |
| Cyl MAWP, kPag        | 5964.0     | 5964.0     | 17581.6    | 17581.6    |
| Cyl Action            | DBL        | DBL        | DBL        | DBL        |
| Cyl Disp, CFM         | 107.6      | 107.6      | 41.1       | 41.1       |
| Pres Suct Intl, kPag  | 654.31     | 654.31     | 2116.69    | 2116.69    |
| Temp Suct Intl, °C    | 27         | 27         | 51         | 51         |
| Suct Zsph             | 0.9741     | 0.9741     | 0.9417     | 0.9417     |
| Pres Disch Intl, kPag | 2363.13    | 2363.13    | 7844.24    | 7844.24    |
| Temp Disch Intl, °C   | 108        | 108        | 146        | 146        |
| HE Suct Gas Vel, FPM  | 6961       | 6961       | 6648       | 6648       |
| HE Disch Gas Vel, FPM | 6311       | 6311       | 5931       | 5931       |
| HE Spcra Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| HE Vol Pkt Avail, %   | 1.17+53.15 | 1.17+53.15 | 0.61+42.12 | 0.61+42.12 |
| Vol Pkt Used, %       | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   |
| HE Min Clr, %         | 18.77      | 18.77      | 18.29      | 18.29      |
| HE Total Clr, %       | 19.95      | 19.95      | 18.89      | 18.89      |
| CE Suct Gas Vel, FPM  | 6571       | 6571       | 5714       | 5714       |
| CE Disch Gas Vel, FPM | 5957       | 5957       | 5097       | 5097       |
| CE Spcra Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| CE Min Clr, %         | 20.36      | 20.36      | 22.17      | 22.17      |
| CE Total Clr, %       | 20.36      | 20.36      | 22.17      | 22.17      |
| Suct Vol Eff HE/CE, % | 64.8/64.2  | 64.8/64.2  | 62.3/57.0  | 62.3/57.0  |
| Disch Event HE/CE, ms | 5.4/6.2    | 5.4/6.2    | 5.0/5.6    | 5.0/5.6    |
| Suct Pseudo-Q HE/CE   | 5.2/4.7    | 5.2/4.7    | 4.4/3.3    | 4.4/3.3    |
| Gas Rod Ld Comp, lbf  | 4496 C     | 4496 C     | 6205 C     | 6205 C     |
| Gas Rod Ld Tens, lbf  | 4042 T     | 4042 T     | 4719 T     | 4719 T     |
| Gas Rod Ld Total, lbf | 8538       | 8538       | 10924      | 10924      |
| Xhd Pin Deg/%Rvrs lbf | 143/77.4   | 143/77.4   | 177/57.3   | 177/57.3   |
| Flow Calc, E3m3/D     | 21.356     | 21.356     | 21.355     | 21.355     |
| Cyl BHP               | 48.3       | 48.3       | 54.6       | 54.6       |





# Ariel Performance



Company: Collicutt Energy Services

Customer: BP Canada

Quote:

Inquiry: 05-25

7.5.5

Case 21:

Project: FH587

## Compressor Data:

|                  |               |                   |        |                   |              |
|------------------|---------------|-------------------|--------|-------------------|--------------|
| Elevation, ft:   | <u>4921.3</u> | Barmtr, kPaa:     | 84.389 | Ambient, °C:      | <u>38.00</u> |
| Frame:           | JGA/4         | Stroke, in:       | 3.00   | Rod Dia, in:      | 1.125        |
| Max RL Tot, lbf: | 20000         | Max RL Tens, lbf: | 10000  | Max RL Comp, lbf: | 11000        |
| Rated RPM:       | 1800          | Rated BHP:        | 560.0  | Rated PS FPM:     | 900.0        |
| Calc RPM:        | 1800.0        | Calc BHP:         | 237    | Calc PS FPM:      | 900.0        |

## Driver Data:

|        |           |
|--------|-----------|
| Type:  | Nat. Gas  |
| Mfg:   | Waukesha  |
| Model: | F18GL/GLD |
| BHP:   | 400       |
| Avail: | 375 (25)  |

## Services

### Stage Data:

|                       | Service 1 | #1  | --- | #2      | --- |
|-----------------------|-----------|-----|-----|---------|-----|
| Flow Req'd, E3m3/D    | 75.000    | --- | --- | 75.000  | --- |
| Flow Calc, E3m3/D     | 49.535    | --- | --- | 49.535  | --- |
| Cyl BHP per Stage     | 107.7     | --- | --- | 117.1   | --- |
| Specific Gravity      | 0.7058    | --- | --- | 0.7058  | --- |
| Ratio of Sp Ht (N)    | 1.2482    | --- | --- | 1.2509  | --- |
| Comp Suct (Zs)        | 0.9700    | --- | --- | 0.9352  | --- |
| Comp Disch (Zd)       | 0.9593    | --- | --- | 0.9290  | --- |
| Pres Suct Line, kPag  | 800.00    | --- | --- | N/A     | --- |
| Pres Suct Flg, kPag   | 791.16    | --- | --- | 2402.41 | --- |
| Pres Disch Flg, kPag  | 2454.47   | --- | --- | 7575.84 | --- |
| Pres Disch Line, kPag | N/A       | --- | --- | 7500.00 | --- |
| Pres Ratio F/F        | 2.900     | --- | --- | 3.080   | --- |
| Temp Suct, °C         | 25.00     | --- | --- | 48.89   | --- |
| Temp Clr Disch, °C    | 48.89     | --- | --- | 43.33   | --- |

### Cylinder Data:

|                        | Throw 2    | Throw 4    | Throw 1    | Throw 3    |
|------------------------|------------|------------|------------|------------|
| Cyl Model              | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
| Cyl Bore, in           | 4.750      | 4.750      | 3.000      | 3.000      |
| Cyl RDP (API), kPag    | 5421.8     | 5421.8     | 15983.3    | 15983.3    |
| Cyl MAWP, kPag         | 5964.0     | 5964.0     | 17581.6    | 17581.6    |
| Cyl Action             | DBL        | DBL        | DBL        | DBL        |
| Disp, CFM              | 107.6      | 107.6      | 41.1       | 41.1       |
| Pres Suct Intl, kPag   | 748.32     | 748.32     | 2304.36    | 2304.36    |
| Temp Suct Intl, °C     | 27         | 27         | 51         | 51         |
| Suct Zsph              | 0.9708     | 0.9708     | 0.9368     | 0.9368     |
| Pres Disch Intl, kPag  | 2572.47    | 2572.47    | 7849.59    | 7849.59    |
| Temp Disch Intl, °C    | 105        | 105        | 140        | 140        |
| HE Suct Gas Vel, FPM   | 6961       | 6961       | 6648       | 6648       |
| HE Disch Gas Vel, FPM  | 6311       | 6311       | 5931       | 5931       |
| HE Spcrrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| HE Vol Pkt Avail, %    | 1.17+53.15 | 1.17+53.15 | 0.61+42.12 | 0.61+42.12 |
| Vol Pkt Used, %        | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   |
| HE Min Clr, %          | 18.77      | 18.77      | 18.29      | 18.29      |
| HE Total Clr, %        | 19.95      | 19.95      | 18.89      | 18.89      |
| CE Suct Gas Vel, FPM   | 6571       | 6571       | 5714       | 5714       |
| CE Disch Gas Vel, FPM  | 5957       | 5957       | 5097       | 5097       |
| CE Spcrrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| CE Min Clr, %          | 20.36      | 20.36      | 22.17      | 22.17      |
| CE Total Clr, %        | 20.36      | 20.36      | 22.17      | 22.17      |
| Suct Vol Eff HE/CE, %  | 66.4/65.8  | 66.4/65.8  | 65.7/61.0  | 65.7/61.0  |
| Disch Event HE/CE, ms  | 5.6/6.4    | 5.6/6.4    | 5.4/6.0    | 5.4/6.0    |
| Suct Pseudo-Q HE/CE    | 5.3/4.7    | 5.3/4.7    | 4.4/3.3    | 4.4/3.3    |
| Gas Rod Ld Comp, lbf   | 4807 C     | 4807 C     | 6045 C     | 6045 C     |
| Gas Rod Ld Tens, lbf   | 4307 T     | 4307 T     | 4532 T     | 4532 T     |
| Gas Rod Ld Total, lbf  | 9114       | 9114       | 10577      | 10577      |
| Xhd Pin Deg/%Rvrrs lbf | 143/75.1   | 143/75.1   | 177/55.7   | 177/55.7   |
| Flow Calc, E3m3/D      | 24.768     | 24.768     | 24.767     | 24.767     |
| Cyl BHP                | 53.8       | 53.8       | 58.5       | 58.5       |





# Ariel Performance



Company: Collicutt Energy Services

Customer: BP Canada

Quote:

Inquiry: 05-25

7.5.5

Case 22:

Project: FH587

## Compressor Data:

|                  |               |                   |        |                   |              |
|------------------|---------------|-------------------|--------|-------------------|--------------|
| Elevation, ft:   | <u>4921.3</u> | Barmtr, kPaa:     | 84.389 | Ambient, °C:      | <u>38.00</u> |
| Frame:           | JGA/4         | Stroke, in:       | 3.00   | Rod Dia, in:      | 1.125        |
| Max RL Tot, lbf: | 20000         | Max RL Tens, lbf: | 10000  | Max RL Comp, lbf: | 11000        |
| Rated RPM:       | 1800          | Rated BHP:        | 560.0  | Rated PS FPM:     | 900.0        |
| Calc RPM:        | 1800.0        | Calc BHP:         | 254    | Calc PS FPM:      | 900.0        |

## Driver Data:

|        |           |
|--------|-----------|
| Type:  | Nat. Gas  |
| Mfg:   | Waukesha  |
| Model: | F18GL/GLD |
| BHP:   | 400       |
| Avail: | 375 (25)  |

## Services

### Service 1

#### Stage Data:

|                       | #1      |     | #2      |     |
|-----------------------|---------|-----|---------|-----|
| Flow Req'd, E3m3/D    | 75.000  | --- | 75.000  | --- |
| Flow Calc, E3m3/D     | 56.428  | --- | 56.429  | --- |
| Cyl BHP per Stage     | 118.6   | --- | 123.5   | --- |
| Specific Gravity      | 0.7059  | --- | 0.7059  | --- |
| Ratio of Sp Ht (N)    | 1.2499  | --- | 1.2532  | --- |
| Comp Suct (Zs)        | 0.9667  | --- | 0.9303  | --- |
| Comp Disch (Zd)       | 0.9555  | --- | 0.9245  | --- |
| Pres Suct Line, kPag  | 900.00  | --- | N/A     | --- |
| Pres Suct Flg, kPag   | 890.16  | --- | 2597.32 | --- |
| Pres Disch Flg, kPag  | 2652.24 | --- | 7575.84 | --- |
| Pres Disch Line, kPag | N/A     | --- | 7500.00 | --- |
| Pres Ratio F/F        | 2.808   | --- | 2.856   | --- |
| Temp Suct, °C         | 25.00   | --- | 48.89   | --- |
| Temp Clr Disch, °C    | 48.89   | --- | 43.33   | --- |

#### Cylinder Data:

### Throw 2

### Throw 4

### Throw 1

### Throw 3

|                        | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
|------------------------|------------|------------|------------|------------|
| Cyl Model              | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
| Cyl Bore, in           | 4.750      | 4.750      | 3.000      | 3.000      |
| Cyl RDP (API), kPag    | 5421.8     | 5421.8     | 15983.3    | 15983.3    |
| Cyl MAWP, kPag         | 5964.0     | 5964.0     | 17581.6    | 17581.6    |
| Cyl Action             | DBL        | DBL        | DBL        | DBL        |
| Cyl Disp, CFM          | 107.6      | 107.6      | 41.1       | 41.1       |
| Pres Suct Intl, kPag   | 842.30     | 842.30     | 2490.98    | 2490.98    |
| Temp Suct Intl, °C     | 27         | 27         | 51         | 51         |
| Suct Zsph              | 0.9675     | 0.9675     | 0.9320     | 0.9320     |
| Pres Disch Intl, kPag  | 2780.61    | 2780.61    | 7854.72    | 7854.72    |
| Temp Disch Intl, °C    | 103        | 103        | 134        | 134        |
| HE Suct Gas Vel, FPM   | 6961       | 6961       | 6648       | 6648       |
| HE Disch Gas Vel, FPM  | 6311       | 6311       | 5931       | 5931       |
| HE Spcrs Used/Max      | 0/2        | 0/2        | 0/1        | 0/1        |
| HE Vol Pkt Avail, %    | 1.17+53.15 | 1.17+53.15 | 0.61+42.12 | 0.61+42.12 |
| Vol Pkt Used, %        | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   |
| HE Min Clr, %          | 18.77      | 18.77      | 18.29      | 18.29      |
| HE Total Clr, %        | 19.95      | 19.95      | 18.89      | 18.89      |
| CE Suct Gas Vel, FPM   | 6571       | 6571       | 5714       | 5714       |
| CE Disch Gas Vel, FPM  | 5957       | 5957       | 5097       | 5097       |
| CE Spcrs Used/Max      | 0/2        | 0/2        | 0/1        | 0/1        |
| CE Min Clr, %          | 20.36      | 20.36      | 22.17      | 22.17      |
| CE Total Clr, %        | 20.36      | 20.36      | 22.17      | 22.17      |
| Suct Vol Eff HE/CE, %  | 67.7/67.1  | 67.7/67.1  | 68.7/64.5  | 68.7/64.5  |
| Disch Event HE/CE, ms  | 5.6/6.6    | 5.6/6.6    | 5.7/6.4    | 5.7/6.4    |
| Suct Pseudo-Q HE/CE    | 5.3/4.7    | 5.3/4.7    | 4.5/3.3    | 4.5/3.3    |
| Gas Rod Ld Comp, lbf   | 5115 C     | 5115 C     | 5886 C     | 5886 C     |
| Gas Rod Ld Tens, lbf   | 4570 T     | 4570 T     | 4346 T     | 4346 T     |
| Gas Rod Ld Total, lbf  | 9685       | 9685       | 10232      | 10232      |
| Xhd Pin Deg/%Rvrs/ lbf | 146/75.8   | 146/75.8   | 178/54.3   | 178/54.3   |
| Flow Calc, E3m3/D      | 28.214     | 28.214     | 28.214     | 28.214     |
| Cyl BHP                | 59.3       | 59.3       | 61.8       | 61.8       |



## Ariel Performance



Company: Collicutt Energy Services

Customer: BP Canada

Quote:

Inquiry: 05-25



7.5.5 Case 23:

Project: FH587

### Compressor Data:

|                  |               |                   |        |                   |              |
|------------------|---------------|-------------------|--------|-------------------|--------------|
| Elevation, ft:   | <u>4921.3</u> | Barmtr, kPaa:     | 84.389 | Ambient, °C:      | <u>38.00</u> |
| Frame:           | JGA/4         | Stroke, in:       | 3.00   | Rod Dia, in:      | 1.125        |
| Max RL Tot, lbf: | 20000         | Max RL Tens, lbf: | 10000  | Max RL Comp, lbf: | 11000        |
| Rated RPM:       | 1800          | Rated BHP:        | 560.0  | Rated PS FPM:     | 900.0        |
| Calc RPM:        | 1800.0        | Calc BHP:         | 270    | Calc PS FPM:      | 900.0        |

### Driver Data:

|        |           |
|--------|-----------|
| Type:  | Nat. Gas  |
| Mfg:   | Waukesha  |
| Model: | F18GL/GLD |
| BHP:   | 400       |
| Avail: | 375 (25)  |

### Services

#### Stage Data:

|                       | Service 1<br>#1 |     | #2      |     |
|-----------------------|-----------------|-----|---------|-----|
| Flow Req'd, E3m3/D    | 75.000          | --- | 75.000  | --- |
| Flow Calc, E3m3/D     | 63.389          | --- | 63.389  | --- |
| Cyl BHP per Stage     | 129.3           | --- | 128.7   | --- |
| Specific Gravity      | 0.7059          | --- | 0.7059  | --- |
| Ratio of Sp Ht (N)    | 1.2514          | --- | 1.2554  | --- |
| Comp Suct (Zs)        | 0.9633          | --- | 0.9255  | --- |
| Comp Disch (Zd)       | 0.9517          | --- | 0.9202  | --- |
| Pres Suct Line, kPag  | 1000.00         | --- | N/A     | --- |
| Pres Suct Flg, kPag   | 989.16          | --- | 2791.27 | --- |
| Pres Disch Flg, kPag  | 2848.92         | --- | 7575.84 | --- |
| Pres Disch Line, kPag | N/A             | --- | 7500.00 | --- |
| Pres Ratio F/F        | 2.732           | --- | 2.664   | --- |
| Temp Suct, °C         | 25.00           | --- | 48.89   | --- |
| Temp Clr Disch, °C    | 48.89           | --- | 43.33   | --- |

#### Cylinder Data:

|                        | Throw 2    | Throw 4    | Throw 1    | Throw 3    |
|------------------------|------------|------------|------------|------------|
| Cyl Model              | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
| Cyl Bore, in           | 4.750      | 4.750      | 3.000      | 3.000      |
| Cyl RDP (API), kPag    | 5421.8     | 5421.8     | 15983.3    | 15983.3    |
| Cyl MAWP, kPag         | 5964.0     | 5964.0     | 17581.6    | 17581.6    |
| Cyl Action             | DBL        | DBL        | DBL        | DBL        |
| Cyl Disp, CFM          | 107.6      | 107.6      | 41.1       | 41.1       |
| Pres Suct Intl, kPag   | 936.24     | 936.24     | 2676.59    | 2676.59    |
| Temp Suct Intl, °C     | 27         | 27         | 51         | 51         |
| Suct Zsph              | 0.9642     | 0.9642     | 0.9272     | 0.9272     |
| Pres Disch Intl, kPag  | 2987.67    | 2987.67    | 7859.68    | 7859.68    |
| Temp Disch Intl, °C    | 102        | 102        | 129        | 129        |
| HE Suct Gas Vel, FPM   | 6961       | 6961       | 6648       | 6648       |
| HE Disch Gas Vel, FPM  | 6311       | 6311       | 5931       | 5931       |
| HE Spcrrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| HE Vol Pkt Avail, %    | 1.17+53.15 | 1.17+53.15 | 0.61+42.12 | 0.61+42.12 |
| Vol Pkt Used, %        | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   |
| HE Min Clr, %          | 18.77      | 18.77      | 18.29      | 18.29      |
| HE Total Clr, %        | 19.95      | 19.95      | 18.89      | 18.89      |
| CE Suct Gas Vel, FPM   | 6571       | 6571       | 5714       | 5714       |
| CE Disch Gas Vel, FPM  | 5957       | 5957       | 5097       | 5097       |
| CE Spcrrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| CE Min Clr, %          | 20.36      | 20.36      | 22.17      | 22.17      |
| CE Total Clr, %        | 20.36      | 20.36      | 22.17      | 22.17      |
| Suct Vol Eff HE/CE, %  | 68.8/68.2  | 68.8/68.2  | 71.3/67.5  | 71.3/67.5  |
| Disch Event HE/CE, ms  | 5.8/6.7    | 5.8/6.7    | 6.0/6.8    | 6.0/6.8    |
| Suct Pseudo-Q HE/CE    | 5.3/4.7    | 5.3/4.7    | 4.5/3.3    | 4.5/3.3    |
| Gas Rod Ld Comp, lbf   | 5420 C     | 5420 C     | 5727 C     | 5727 C     |
| Gas Rod Ld Tens, lbf   | 4830 T     | 4830 T     | 4161 T     | 4161 T     |
| Gas Rod Ld Total, lbf  | 10250      | 10250      | 9888       | 9888       |
| Xhd Pin Deg/%RvrsI lbf | 154/76.3   | 154/76.3   | 178/53.5   | 178/53.5   |
| Flow Calc, E3m3/D      | 31.695     | 31.695     | 31.694     | 31.694     |
| Cyl BHP                | 64.6       | 64.6       | 64.4       | 64.4       |





# Ariel Performance

Company: Collicutt Energy Services

Customer: BP Canada

Quote:

Inquiry: 05-25

7.5.5

Case 24:

Project: FH587



## Compressor Data:

|                  |               |                   |        |                   |              |
|------------------|---------------|-------------------|--------|-------------------|--------------|
| Elevation,ft:    | <u>4921.3</u> | Barmtr,kPaa:      | 84.389 | Ambient,°C:       | <u>38.00</u> |
| Frame:           | JGA/4         | Stroke, in:       | 3.00   | Rod Dia, in:      | 1.125        |
| Max RL Tot, lbf: | 20000         | Max RL Tens, lbf: | 10000  | Max RL Comp, lbf: | 11000        |
| Rated RPM:       | 1800          | Rated BHP:        | 560.0  | Rated PS FPM:     | 900.0        |
| Calc RPM:        | 1800.0        | Calc BHP:         | 285    | Calc PS FPM:      | 900.0        |

## Driver Data:

|        |           |
|--------|-----------|
| Type:  | Nat. Gas  |
| Mfg:   | Waukesha  |
| Model: | F18GL/GLD |
| BHP:   | 400       |
| Avail: | 375 (25)  |

## Services

### Service 1

### Stage Data:

|                       | #1      |     | #2      |     |
|-----------------------|---------|-----|---------|-----|
| Flow Req'd, E3m3/D    | 75.000  | --- | 75.000  | --- |
| Flow Calc, E3m3/D     | 70.416  | --- | 70.415  | --- |
| Cyl BHP per Stage     | 139.8   | --- | 132.8   | --- |
| Specific Gravity      | 0.7059  | --- | 0.7059  | --- |
| Ratio of Sp Ht (N)    | 1.2530  | --- | 1.2574  | --- |
| Comp Suct (Zs)        | 0.9599  | --- | 0.9208  | --- |
| Comp Disch (Zd)       | 0.9480  | --- | 0.9160  | --- |
| Pres Suct Line, kPag  | 1100.00 | --- | N/A     | --- |
| Pres Suct Flg, kPag   | 1088.16 | --- | 2984.39 | --- |
| Pres Disch Flg, kPag  | 3044.64 | --- | 7575.84 | --- |
| Pres Disch Line, kPag | N/A     | --- | 7500.00 | --- |
| Pres Ratio F/F        | 2.669   | --- | 2.496   | --- |
| Temp Suct, °C         | 25.00   | --- | 48.89   | --- |
| Temp Clr Disch, °C    | 48.89   | --- | 43.33   | --- |

### Cylinder Data:

#### Throw 2

#### Throw 4

#### Throw 1

#### Throw 3

|                        | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
|------------------------|------------|------------|------------|------------|
| Cyl Model              | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
| Cyl Bore, in           | 4.750      | 4.750      | 3.000      | 3.000      |
| Cyl RDP (API), kPag    | 5421.8     | 5421.8     | 15983.3    | 15983.3    |
| Cyl MAWP, kPag         | 5964.0     | 5964.0     | 17581.6    | 17581.6    |
| Cyl Action             | DBL        | DBL        | DBL        | DBL        |
| Cyl Disp, CFM          | 107.6      | 107.6      | 41.1       | 41.1       |
| Pres Suct Intl, kPag   | 1030.15    | 1030.15    | 2861.33    | 2861.33    |
| Temp Suct Intl, °C     | 27         | 27         | 51         | 51         |
| Suct Zsph              | 0.9609     | 0.9609     | 0.9224     | 0.9224     |
| Pres Disch Intl, kPag  | 3193.79    | 3193.79    | 7864.48    | 7864.48    |
| Temp Disch Intl, °C    | 100        | 100        | 124        | 124        |
| HE Suct Gas Vel, FPM   | 6961       | 6961       | 6648       | 6648       |
| HE Disch Gas Vel, FPM  | 6311       | 6311       | 5931       | 5931       |
| HE Spcrrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| HE Vol Pkt Avail, %    | 1.17+53.15 | 1.17+53.15 | 0.61+42.12 | 0.61+42.12 |
| Vol Pkt Used, %        | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   |
| HE Min Clr, %          | 18.77      | 18.77      | 18.29      | 18.29      |
| HE Total Clr, %        | 19.95      | 19.95      | 18.89      | 18.89      |
| CE Suct Gas Vel, FPM   | 6571       | 6571       | 5714       | 5714       |
| CE Disch Gas Vel, FPM  | 5957       | 5957       | 5097       | 5097       |
| CE Spcrrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| CE Min Clr, %          | 20.36      | 20.36      | 22.17      | 22.17      |
| CE Total Clr, %        | 20.36      | 20.36      | 22.17      | 22.17      |
| Suct Vol Eff HE/CE, %  | 69.7/69.2  | 69.7/69.2  | 73.6/70.1  | 73.6/70.1  |
| Disch Event HE/CE, ms  | 5.9/6.9    | 5.9/6.9    | 6.3/7.0    | 6.3/7.0    |
| Suct Pseudo-Q HE/CE    | 5.3/4.7    | 5.3/4.7    | 4.5/3.3    | 4.5/3.3    |
| Gas Rod Ld Comp, lbf   | 5722 C     | 5722 C     | 5569 C     | 5569 C     |
| Gas Rod Ld Tens, lbf   | 5088 T     | 5088 T     | 3976 T     | 3976 T     |
| Gas Rod Ld Total, lbf  | 10810      | 10810      | 9545       | 9545       |
| Xhd Pin Deg/%RvrsI lbf | 166/77.0   | 166/77.0   | 179/52.6   | 179/52.6   |
| Flow Calc, E3m3/D      | 35.208     | 35.208     | 35.208     | 35.208     |
| Cyl BHP                | 69.9       | 69.9       | 66.4       | 66.4       |





# Ariel Performance

Company: Collicutt Energy Services  
 Quote:  
 Case 25:

Customer: BP Canada  
 Inquiry: 05-25  
 Project: FH587



7.5.5

### Compressor Data:

|                  |               |                   |        |                   |              |
|------------------|---------------|-------------------|--------|-------------------|--------------|
| Elevation, ft:   | <u>4921.3</u> | Barmtr, kPaa:     | 84.389 | Ambient, °C:      | <u>38.00</u> |
| Frame:           | JGA/4         | Stroke, in:       | 3.00   | Rod Dia, in:      | 1.125        |
| Max RL Tot, lbf: | 20000         | Max RL Tens, lbf: | 10000  | Max RL Comp, lbf: | 11000        |
| Rated RPM:       | 1800          | Rated BHP:        | 560.0  | Rated PS FPM:     | 900.0        |
| Calc RPM:        | 1800.0        | Calc BHP:         | 298    | Calc PS FPM:      | 900.0        |

### Driver Data:

|        |           |
|--------|-----------|
| Type:  | Nat. Gas  |
| Mfg:   | Waukesha  |
| Model: | F18GL/GLD |
| BHP:   | 400       |
| Avail: | 375 (25)  |

### Services

#### Stage Data:

|                       | Service 1 | #1  | #2      | --- |
|-----------------------|-----------|-----|---------|-----|
| Flow Req'd, E3m3/D    | 75.000    | --- | 75.000  | --- |
| Flow Calc, E3m3/D     | 77.507    | --- | 77.507  | --- |
| Cyl BHP per Stage     | 150.2     | --- | 135.9   | --- |
| Specific Gravity      | 0.7059    | --- | 0.7059  | --- |
| Ratio of Sp Ht (N)    | 1.2544    | --- | 1.2595  | --- |
| Comp Suct (Zs)        | 0.9566    | --- | 0.9161  | --- |
| Comp Disch (Zd)       | 0.9443    | --- | 0.9118  | --- |
| Pres Suct Line, kPag  | 1200.00   | --- | N/A     | --- |
| Pres Suct Flg, kPag   | 1187.16   | --- | 3176.72 | --- |
| Pres Disch Flg, kPag  | 3239.45   | --- | 7575.84 | --- |
| Pres Disch Line, kPag | N/A       | --- | 7500.00 | --- |
| Pres Ratio F/F        | 2.614     | --- | 2.349   | --- |
| Temp Suct, °C         | 25.00     | --- | 48.89   | --- |
| Temp Clr Disch, °C    | 48.89     | --- | 43.33   | --- |

#### Cylinder Data:

|                       | Throw 2    | Throw 4    | Throw 1    | Throw 3    |
|-----------------------|------------|------------|------------|------------|
| Cyl Model             | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
| Cyl Bore, in          | 4.750      | 4.750      | 3.000      | 3.000      |
| Cyl RDP (API), kPag   | 5421.8     | 5421.8     | 15983.3    | 15983.3    |
| Cyl MAWP, kPag        | 5964.0     | 5964.0     | 17581.6    | 17581.6    |
| Cyl Action            | DBL        | DBL        | DBL        | DBL        |
| Disp, CFM             | 107.6      | 107.6      | 41.1       | 41.1       |
| Pres Suct Intl, kPag  | 1124.02    | 1124.02    | 3045.22    | 3045.22    |
| Temp Suct Intl, °C    | 27         | 27         | 51         | 51         |
| Suct Zsph             | 0.9576     | 0.9576     | 0.9177     | 0.9177     |
| Pres Disch Intl, kPag | 3399.02    | 3399.02    | 7869.15    | 7869.15    |
| Temp Disch Intl, °C   | 99         | 99         | 119        | 119        |
| HE Suct Gas Vel, FPM  | 6961       | 6961       | 6648       | 6648       |
| HE Disch Gas Vel, FPM | 6311       | 6311       | 5931       | 5931       |
| HE Spcrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| HE Vol Pkt Avail, %   | 1.17+53.15 | 1.17+53.15 | 0.61+42.12 | 0.61+42.12 |
| Vol Pkt Used, %       | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   |
| HE Min Clr, %         | 18.77      | 18.77      | 18.29      | 18.29      |
| HE Total Clr, %       | 19.95      | 19.95      | 18.89      | 18.89      |
| CE Suct Gas Vel, FPM  | 6571       | 6571       | 5714       | 5714       |
| CE Disch Gas Vel, FPM | 5957       | 5957       | 5097       | 5097       |
| CE Spcrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| CE Min Clr, %         | 20.36      | 20.36      | 22.17      | 22.17      |
| CE Total Clr, %       | 20.36      | 20.36      | 22.17      | 22.17      |
| Suct Vol Eff HE/CE, % | 70.4/70.0  | 70.4/70.0  | 75.6/72.5  | 75.6/72.5  |
| Disch Event HE/CE, ms | 6.0/6.9    | 6.0/6.9    | 6.7/7.4    | 6.7/7.4    |
| Suct Pseudo-Q HE/CE   | 5.3/4.8    | 5.3/4.8    | 4.5/3.3    | 4.5/3.3    |
| Gas Rod Ld Comp, lbf  | 6023 C     | 6023 C     | 5411 C     | 5411 C     |
| Gas Rod Ld Tens, lbf  | 5344 T     | 5344 T     | 3793 T     | 3793 T     |
| Gas Rod Ld Total, lbf | 11367      | 11367      | 9204       | 9204       |
| Xhd Pin Deg/%Rvrs lbf | 168/77.6   | 168/77.6   | 178/54.0   | 178/54.0   |
| Flow Calc, E3m3/D     | 38.754     | 38.754     | 38.753     | 38.753     |
| Cyl BHP               | 75.1       | 75.1       | 67.9       | 67.9       |





### Ariel Performance



Company: Collicutt Energy Services

Customer: BP Canada

Quote:

Inquiry: 05-25

7.5.5

Case 26:

Project: FH587

#### Compressor Data:

|                  |               |                   |        |                   |              |
|------------------|---------------|-------------------|--------|-------------------|--------------|
| Elevation,ft:    | <u>4921.3</u> | Barmtr,kPaa:      | 84.389 | Ambient,°C:       | <u>38.00</u> |
| Frame:           | JGA/4         | Stroke, in:       | 3.00   | Rod Dia, in:      | 1.125        |
| Max RL Tot, lbf: | 20000         | Max RL Tens, lbf: | 10000  | Max RL Comp, lbf: | 11000        |
| Rated RPM:       | 1800          | Rated BHP:        | 560.0  | Rated PS FPM:     | 900.0        |
| Calc RPM:        | 1800.0        | Calc BHP:         | 310    | Calc PS FPM:      | 900.0        |

#### Driver Data:

|        |           |
|--------|-----------|
| Type:  | Nat. Gas  |
| Mfg:   | Waukesha  |
| Model: | F18GL/GLD |
| BHP:   | 400       |
| Avail: | 375 (25)  |

#### Services

#### Service 1

##### Stage Data:

##### #1

##### #2

|                       |         |     |         |     |
|-----------------------|---------|-----|---------|-----|
| Flow Req'd, E3m3/D    | 75.000  | --- | 75.000  | --- |
| Flow Calc, E3m3/D     | 84.663  | --- | 84.664  | --- |
| Cyl BHP per Stage     | 160.5   | --- | 138.0   | --- |
| Specific Gravity      | 0.7059  | --- | 0.7059  | --- |
| Ratio of Sp Ht (N)    | 1.2558  | --- | 1.2614  | --- |
| Comp Suct (Zs)        | 0.9532  | --- | 0.9114  | --- |
| Comp Disch (Zd)       | 0.9407  | --- | 0.9077  | --- |
| Pres Suct Line, kPag  | 1300.00 | --- | N/A     | --- |
| Pres Suct Flg, kPag   | 1286.16 | --- | 3368.37 | --- |
| Pres Disch Flg, kPag  | 3433.51 | --- | 7575.84 | --- |
| Pres Disch Line, kPag | N/A     | --- | 7500.00 | --- |
| Pres Ratio F/F        | 2.567   | --- | 2.219   | --- |
| Temp Suct, °C         | 25.00   | --- | 48.89   | --- |
| Temp Clr Disch, °C    | 48.89   | --- | 43.33   | --- |

##### Cylinder Data:

##### Throw 2

##### Throw 4

##### Throw 1

##### Throw 3

|                        |            |            |            |            |
|------------------------|------------|------------|------------|------------|
| Cyl Model              | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
| Cyl Bore, in           | 4.750      | 4.750      | 3.000      | 3.000      |
| Cyl RDP (API), kPag    | 5421.8     | 5421.8     | 15983.3    | 15983.3    |
| Cyl MAWP, kPag         | 5964.0     | 5964.0     | 17581.6    | 17581.6    |
| Cyl Action             | DBL        | DBL        | DBL        | DBL        |
| Cyl Disp, CFM          | 107.6      | 107.6      | 41.1       | 41.1       |
| Pres Suct Intl, kPag   | 1217.86    | 1217.86    | 3228.39    | 3228.39    |
| Temp Suct Intl, °C     | 27         | 27         | 51         | 51         |
| Suct Zsph              | 0.9543     | 0.9543     | 0.9131     | 0.9131     |
| Pres Disch Intl, kPag  | 3603.50    | 3603.50    | 7873.71    | 7873.71    |
| Temp Disch Intl, °C    | 98         | 98         | 115        | 115        |
| HE Suct Gas Vel, FPM   | 6961       | 6961       | 6648       | 6648       |
| HE Disch Gas Vel, FPM  | 6311       | 6311       | 5931       | 5931       |
| HE Spcrrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| HE Vol Pkt Avail, %    | 1.17+53.15 | 1.17+53.15 | 0.61+42.12 | 0.61+42.12 |
| Vol Pkt Used, %        | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   |
| HE Min Clr, %          | 18.77      | 18.77      | 18.29      | 18.29      |
| HE Total Clr, %        | 19.95      | 19.95      | 18.89      | 18.89      |
| CE Suct Gas Vel, FPM   | 6571       | 6571       | 5714       | 5714       |
| CE Disch Gas Vel, FPM  | 5957       | 5957       | 5097       | 5097       |
| CE Spcrrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| CE Min Clr, %          | 20.36      | 20.36      | 22.17      | 22.17      |
| CE Total Clr, %        | 20.36      | 20.36      | 22.17      | 22.17      |
| Suct Vol Eff HE/CE, %  | 71.1/70.7  | 71.1/70.7  | 77.4/74.6  | 77.4/74.6  |
| Disch Event HE/CE, ms  | 6.1/7.0    | 6.1/7.0    | 6.9/7.7    | 6.9/7.7    |
| Suct Pseudo-Q HE/CE    | 5.4/4.8    | 5.4/4.8    | 4.6/3.4    | 4.6/3.4    |
| Gas Rod Ld Comp, lbf   | 6322 C     | 6322 C     | 5254 C     | 5254 C     |
| Gas Rod Ld Tens, lbf   | 5598 T     | 5598 T     | 3610 T     | 3610 T     |
| Gas Rod Ld Total, lbf  | 11920      | 11920      | 8864       | 8864       |
| Xhd Pin Deg/%Rvrs/ lbf | 170/77.7   | 170/77.7   | 167/55.8   | 167/55.8   |
| Flow Calc, E3m3/D      | 42.331     | 42.331     | 42.332     | 42.332     |
| Cyl BHP                | 80.3       | 80.3       | 69.0       | 69.0       |



## Ariel Performance



Company: Collicutt Energy Services

Customer: BP Canada



Quote:

Inquiry: 05-25

7.5.5

Case 27:

Project: FH587

### Compressor Data:

|                  |               |                   |        |                   |              |
|------------------|---------------|-------------------|--------|-------------------|--------------|
| Elevation, ft:   | <u>4921.3</u> | Barmtr, kPaa:     | 84.389 | Ambient, °C:      | <u>38.00</u> |
| Frame:           | JGA/4         | Stroke, in:       | 3.00   | Rod Dia, in:      | 1.125        |
| Max RL Tot, lbf: | 20000         | Max RL Tens, lbf: | 10000  | Max RL Comp, lbf: | 11000        |
| Rated RPM:       | 1800          | Rated BHP:        | 560.0  | Rated PS FPM:     | 900.0        |
| Calc RPM:        | 1800.0        | Calc BHP:         | 322    | Calc PS FPM:      | 900.0        |

### Driver Data:

|        |           |
|--------|-----------|
| Type:  | Nat. Gas  |
| Mfg:   | Waukesha  |
| Model: | F18GL/GLD |
| BHP:   | 400       |
| Avail: | 375 (25)  |

### Services

#### Service 1

#### Stage Data:

|                       | #1      |     | #2      |     |
|-----------------------|---------|-----|---------|-----|
| Flow Req'd, E3m3/D    | 75.000  | --- | 75.000  | --- |
| Flow Calc, E3m3/D     | 91.883  | --- | 91.884  | --- |
| Cyl BHP per Stage     | 170.7   | --- | 139.3   | --- |
| Specific Gravity      | 0.7060  | --- | 0.7060  | --- |
| Ratio of Sp Ht (N)    | 1.2572  | --- | 1.2632  | --- |
| Comp Suct (Zs)        | 0.9499  | --- | 0.9069  | --- |
| Comp Disch (Zd)       | 0.9372  | --- | 0.9036  | --- |
| Pres Suct Line, kPag  | 1400.00 | --- | N/A     | --- |
| Pres Suct Flg, kPag   | 1385.16 | --- | 3559.35 | --- |
| Pres Disch Flg, kPag  | 3626.80 | --- | 7575.84 | --- |
| Pres Disch Line, kPag | N/A     | --- | 7500.00 | --- |
| Pres Ratio F/F        | 2.525   | --- | 2.102   | --- |
| Temp Suct, °C         | 25.00   | --- | 48.89   | --- |
| Temp Clr Disch, °C    | 48.89   | --- | 43.33   | --- |

#### Cylinder Data:

|                        | Throw 2    | Throw 4    | Throw 1    | Throw 3    |
|------------------------|------------|------------|------------|------------|
| Cyl Model              | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
| Cyl Bore, in           | 4.750      | 4.750      | 3.000      | 3.000      |
| Cyl RDP (API), kPag    | 5421.8     | 5421.8     | 15983.3    | 15983.3    |
| Cyl MAWP, kPag         | 5964.0     | 5964.0     | 17581.6    | 17581.6    |
| Cyl Action             | DBL        | DBL        | DBL        | DBL        |
| Disp, CFM              | 107.6      | 107.6      | 41.1       | 41.1       |
| Pres Suct Intl, kPag   | 1311.66    | 1311.66    | 3410.83    | 3410.83    |
| Temp Suct Intl, °C     | 27         | 27         | 51         | 51         |
| Suct Zsph              | 0.9510     | 0.9510     | 0.9085     | 0.9085     |
| Pres Disch Intl, kPag  | 3807.24    | 3807.24    | 7878.16    | 7878.16    |
| Temp Disch Intl, °C    | 97         | 97         | 111        | 111        |
| HE Suct Gas Vel, FPM   | 6961       | 6961       | 6648       | 6648       |
| HE Disch Gas Vel, FPM  | 6311       | 6311       | 5931       | 5931       |
| HE Spcrrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| HE Vol Pkt Avail, %    | 1.17+53.15 | 1.17+53.15 | 0.61+42.12 | 0.61+42.12 |
| Vol Pkt Used, %        | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   |
| HE Min Clr, %          | 18.77      | 18.77      | 18.29      | 18.29      |
| HE Total Clr, %        | 19.95      | 19.95      | 18.89      | 18.89      |
| CE Suct Gas Vel, FPM   | 6571       | 6571       | 5714       | 5714       |
| CE Disch Gas Vel, FPM  | 5957       | 5957       | 5097       | 5097       |
| CE Spcrrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| CE Min Clr, %          | 20.36      | 20.36      | 22.17      | 22.17      |
| CE Total Clr, %        | 20.36      | 20.36      | 22.17      | 22.17      |
| Suct Vol Eff HE/CE, %  | 71.7/71.3  | 71.7/71.3  | 79.0/76.4  | 79.0/76.4  |
| Disch Event HE/CE, ms  | 6.2/7.1    | 6.2/7.1    | 7.2/8.1    | 7.2/8.1    |
| Suct Pseudo-Q HE/CE    | 5.4/4.8    | 5.4/4.8    | 4.6/3.4    | 4.6/3.4    |
| Gas Rod Ld Comp, lbf   | 6619 C     | 6619 C     | 5097 C     | 5097 C     |
| Gas Rod Ld Tens, lbf   | 5851 T     | 5851 T     | 3427 T     | 3427 T     |
| Gas Rod Ld Total, lbf  | 12470      | 12470      | 8524       | 8524       |
| Xhd Pin Deg/%Rvrsl lbf | 171/77.2   | 171/77.2   | 164/57.1   | 164/57.1   |
| Flow Calc, E3m3/D      | 45.942     | 45.942     | 45.942     | 45.942     |
| Cyl BHP                | 85.4       | 85.4       | 69.6       | 69.6       |





# Ariel Performance

Company: Collicutt Energy Services

Customer: BP Canada

Quote:

Inquiry: 05-25

7.5.5

Case 28:

Project: FH587



### Compressor Data:

|                  |               |                   |        |                   |              |
|------------------|---------------|-------------------|--------|-------------------|--------------|
| Elevation, ft:   | <u>4921.3</u> | Barmtr, kPaa:     | 84.389 | Ambient, °C:      | <u>38.00</u> |
| Frame:           | JGA/4         | Stroke, in:       | 3.00   | Rod Dia, in:      | 1.125        |
| Max RL Tot, lbf: | 20000         | Max RL Tens, lbf: | 10000  | Max RL Comp, lbf: | 11000        |
| Rated RPM:       | 1800          | Rated BHP:        | 560.0  | Rated PS FPM:     | 900.0        |
| Calc RPM:        | 1800.0        | Calc BHP:         | 199    | Calc PS FPM:      | 900.0        |

### Driver Data:

|        |           |
|--------|-----------|
| Type:  | Nat. Gas  |
| Mfg:   | Waukesha  |
| Model: | F18GL/GLD |
| BHP:   | 400       |
| Avail: | 375 (25)  |

### Services

#### Service 1

#### Stage Data:

|                       | #1      |      | #2      |      |
|-----------------------|---------|------|---------|------|
| Flow Req'd, E3m3/D    | 75.000  | ---  | 75.000  | ---  |
| Flow Calc, E3m3/D     | 35.397  | ---- | 35.396  | ---  |
| Cyl BHP per Stage     | 85.4    | ---  | 101.5   | ---- |
| Specific Gravity      | 0.7058  | ---  | 0.7058  | ---  |
| Ratio of Sp Ht (N)    | 1.2444  | ---  | 1.2459  | ---  |
| Comp Suct (Zs)        | 0.9768  | ---  | 0.9440  | ---  |
| Comp Disch (Zd)       | 0.9670  | ---  | 0.9381  | ---  |
| Pres Suct Line, kPag  | 600.00  | ---  | N/A     | ---- |
| Pres Suct Flg, kPag   | 593.16  | ---  | 2054.83 | ---- |
| Pres Disch Flg, kPag  | 2102.11 | ---- | 8080.84 | ---  |
| Pres Disch Line, kPag | N/A     | ---  | 8000.00 | ---  |
| Pres Ratio F/F        | 3.227   | ---  | 3.817   | ---  |
| Temp Suct, °C         | 25.00   | ---  | 48.89   | ---  |
| Temp Clr Disch, °C    | 48.89   | ---  | 43.33   | ---  |

#### Cylinder Data:

#### Throw 2

#### Throw 4

#### Throw 1

#### Throw 3

|                        |            |            |            |            |
|------------------------|------------|------------|------------|------------|
| Cyl Model              | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
| Cyl Bore, in           | 4.750      | 4.750      | 3.000      | 3.000      |
| Cyl RDP (API), kPag    | 5421.8     | 5421.8     | 15983.3    | 15983.3    |
| Cyl MAWP, kPag         | 5964.0     | 5964.0     | 17581.6    | 17581.6    |
| Cyl Action             | DBL        | DBL        | DBL        | DBL        |
| Cyl Disp, CFM          | 107.6      | 107.6      | 41.1       | 41.1       |
| Pres Suct Intl, kPag   | 560.26     | 560.26     | 1971.39    | 1971.39    |
| Temp Suct Intl, °C     | 28         | 28         | 52         | 52         |
| Suct Zsph              | 0.9774     | 0.9774     | 0.9456     | 0.9456     |
| Pres Disch Intl, kPag  | 2201.05    | 2201.05    | 8358.62    | 8358.62    |
| Temp Disch Intl, °C    | 112        | 112        | 156        | 156        |
| HE Suct Gas Vel, FPM   | 6961       | 6961       | 6648       | 6648       |
| HE Disch Gas Vel, FPM  | 6311       | 6311       | 5931       | 5931       |
| HE Spcrrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| HE Vol Pkt Avail, %    | 1.17+53.15 | 1.17+53.15 | 0.61+42.12 | 0.61+42.12 |
| Vol Pkt Used, %        | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   |
| HE Min Clr, %          | 18.77      | 18.77      | 18.29      | 18.29      |
| HE Total Clr, %        | 19.95      | 19.95      | 18.89      | 18.89      |
| CE Suct Gas Vel, FPM   | 6571       | 6571       | 5714       | 5714       |
| CE Disch Gas Vel, FPM  | 5957       | 5957       | 5097       | 5097       |
| CE Spcrrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| CE Min Clr, %          | 20.36      | 20.36      | 22.17      | 22.17      |
| CE Total Clr, %        | 20.36      | 20.36      | 22.17      | 22.17      |
| Suct Vol Eff HE/CE, %  | 61.8/61.2  | 61.8/61.2  | 56.2/50.0  | 56.2/50.0  |
| Disch Event HE/CE, ms  | 5.1/5.8    | 5.1/5.8    | 4.4/4.9    | 4.4/4.9    |
| Suct Pseudo-Q HE/CE    | 5.2/4.6    | 5.2/4.6    | 4.4/3.2    | 4.4/3.2    |
| Gas Rod Ld Comp, lbf   | 4307 C     | 4307 C     | 6863 C     | 6863 C     |
| Gas Rod Ld Tens, lbf   | 3891 T     | 3891 T     | 5319 T     | 5319 T     |
| Gas Rod Ld Total, lbf  | 8198       | 8198       | 12182      | 12182      |
| Xhd Pin Deg/%RvrsI lbf | 144/82.9   | 144/82.9   | 176/62.9   | 176/62.9   |
| Flow Calc, E3m3/D      | 17.699     | 17.699     | 17.698     | 17.698     |
| Cyl BHP                | 42.7       | 42.7       | 50.8       | 50.8       |



## Ariel Performance



Company: Collicutt Energy Services  
 Quote:  
 Case 29:

Customer: BP Canada  
 Inquiry: 05-25  
 Project: FH587



7.5.5

### Compressor Data:

|                  |               |                   |        |                   |              |
|------------------|---------------|-------------------|--------|-------------------|--------------|
| Elevation, ft:   | <u>4921.3</u> | Barmtr, kPaa:     | 84.389 | Ambient, °C:      | <u>38.00</u> |
| Frame:           | JGA/4         | Stroke, in:       | 3.00   | Rod Dia, in:      | 1.125        |
| Max RL Tot, lbf: | 20000         | Max RL Tens, lbf: | 10000  | Max RL Comp, lbf: | 11000        |
| Rated RPM:       | 1800          | Rated BHP:        | 560.0  | Rated PS FPM:     | 900.0        |
| Calc RPM:        | 1800.0        | Calc BHP:         | 221    | Calc PS FPM:      | 900.0        |

### Driver Data:

Type: Nat. Gas  
 Mfg: Waukesha  
 Model: F18GL/GLD  
 BHP: 400  
 Avail: 375 (25)

### Services

#### Stage Data:

|                       | Service 1<br>#1 |     | #2      |     |
|-----------------------|-----------------|-----|---------|-----|
| Flow Req'd, E3m3/D    | 75.000          | --- | 75.000  | --- |
| Flow Calc, E3m3/D     | 42.139          | --- | 42.139  | --- |
| Cyl BHP per Stage     | 97.0            | --- | 111.9   | --- |
| Specific Gravity      | 0.7058          | --- | 0.7058  | --- |
| Ratio of Sp Ht (N)    | 1.2463          | --- | 1.2484  | --- |
| Comp Suct (Zs)        | 0.9734          | --- | 0.9390  | --- |
| Comp Disch (Zd)       | 0.9630          | --- | 0.9334  | --- |
| Pres Suct Line, kPag  | 700.00          | --- | N/A     | --- |
| Pres Suct Flg, kPag   | 692.16          | --- | 2252.03 | --- |
| Pres Disch Flg, kPag  | 2302.64         | --- | 8080.84 | --- |
| Pres Disch Line, kPag | N/A             | --- | 8000.00 | --- |
| Pres Ratio F/F        | 3.074           | --- | 3.495   | --- |
| Temp Suct, °C         | 25.00           | --- | 48.89   | --- |
| Temp Clr Disch, °C    | 48.89           | --- | 43.33   | --- |

#### Cylinder Data:

|                        | Throw 2    | Throw 4    | Throw 1    | Throw 3    |
|------------------------|------------|------------|------------|------------|
| Cyl Model              | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
| Cyl Bore, in           | 4.750      | 4.750      | 3.000      | 3.000      |
| Cyl RDP (API), kPag    | 5421.8     | 5421.8     | 15983.3    | 15983.3    |
| Cyl MAWP, kPag         | 5964.0     | 5964.0     | 17581.6    | 17581.6    |
| Cyl Action             | DBL        | DBL        | DBL        | DBL        |
| Disp, CFM              | 107.6      | 107.6      | 41.1       | 41.1       |
| Pres Suct Intl, kPag   | 654.31     | 654.31     | 2160.36    | 2160.36    |
| Temp Suct Intl, °C     | 27         | 27         | 52         | 52         |
| Suct Zsph              | 0.9741     | 0.9741     | 0.9407     | 0.9407     |
| Pres Disch Intl, kPag  | 2412.01    | 2412.01    | 8364.42    | 8364.42    |
| Temp Disch Intl, °C    | 109        | 109        | 150        | 150        |
| HE Suct Gas Vel, FPM   | 6961       | 6961       | 6648       | 6648       |
| HE Disch Gas Vel, FPM  | 6311       | 6311       | 5931       | 5931       |
| HE Spcrrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| HE Vol Pkt Avail, %    | 1.17+53.15 | 1.17+53.15 | 0.61+42.12 | 0.61+42.12 |
| Vol Pkt Used, %        | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   |
| HE Min Clr, %          | 18.77      | 18.77      | 18.29      | 18.29      |
| HE Total Clr, %        | 19.95      | 19.95      | 18.89      | 18.89      |
| CE Suct Gas Vel, FPM   | 6571       | 6571       | 5714       | 5714       |
| CE Disch Gas Vel, FPM  | 5957       | 5957       | 5097       | 5097       |
| CE Spcrrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| CE Min Clr, %          | 20.36      | 20.36      | 22.17      | 22.17      |
| CE Total Clr, %        | 20.36      | 20.36      | 22.17      | 22.17      |
| Suct Vol Eff HE/CE, %  | 63.9/63.3  | 63.9/63.3  | 60.4/54.8  | 60.4/54.8  |
| Disch Event HE/CE, ms  | 5.3/6.1    | 5.3/6.1    | 4.8/5.4    | 4.8/5.4    |
| Suct Pseudo-Q HE/CE    | 5.2/4.7    | 5.2/4.7    | 4.4/3.3    | 4.4/3.3    |
| Gas Rod Ld Comp, lbf   | 4622 C     | 4622 C     | 6702 C     | 6702 C     |
| Gas Rod Ld Tens, lbf   | 4160 T     | 4160 T     | 5131 T     | 5131 T     |
| Gas Rod Ld Total, lbf  | 8782       | 8782       | 11833      | 11833      |
| Xhd Pin Deg/%Rvrsl lbf | 142/76.2   | 142/76.2   | 176/59.4   | 176/59.4   |
| Flow Calc, E3m3/D      | 21.070     | 21.070     | 21.070     | 21.070     |
| Cyl BHP                | 48.5       | 48.5       | 55.9       | 55.9       |





# Ariel Performance



Company: Collicutt Energy Services

Customer: BP Canada

Quote:

Inquiry: 05-25

7.5.5

Case 30:

Project: FH587

## Compressor Data:

|                  |               |                   |        |                   |              |
|------------------|---------------|-------------------|--------|-------------------|--------------|
| Elevation, ft:   | <u>4921.3</u> | Barmtr, kPaa:     | 84.389 | Ambient, °C:      | <u>38.00</u> |
| Frame:           | JGA/4         | Stroke, in:       | 3.00   | Rod Dia, in:      | 1.125        |
| Max RL Tot, lbf: | 20000         | Max RL Tens, lbf: | 10000  | Max RL Comp, lbf: | 11000        |
| Rated RPM:       | 1800          | Rated BHP:        | 560.0  | Rated PS FPM:     | 900.0        |
| Calc RPM:        | 1800.0        | Calc BHP:         | 241    | Calc PS FPM:      | 900.0        |

## Driver Data:

|        |           |
|--------|-----------|
| Type:  | Nat. Gas  |
| Mfg:   | Waukesha  |
| Model: | F18GL/GLD |
| BHP:   | 400       |
| Avail: | 375 (25)  |

## Services

### Service 1

#### Stage Data:

|                       | #1      |     | #2      |     |
|-----------------------|---------|-----|---------|-----|
| Flow Req'd, E3m3/D    | 75.000  | --- | 75.000  | --- |
| Flow Calc, E3m3/D     | 48.955  | --- | 48.954  | --- |
| Cyl BHP per Stage     | 108.3   | --- | 120.6   | --- |
| Specific Gravity      | 0.7058  | --- | 0.7058  | --- |
| Ratio of Sp Ht (N)    | 1.2480  | --- | 1.2507  | --- |
| Comp Suct (Zs)        | 0.9700  | --- | 0.9341  | --- |
| Comp Disch (Zd)       | 0.9591  | --- | 0.9289  | --- |
| Pres Suct Line, kPag  | 800.00  | --- | N/A     | --- |
| Pres Suct Flg, kPag   | 791.16  | --- | 2448.08 | --- |
| Pres Disch Flg, kPag  | 2501.83 | --- | 8080.84 | --- |
| Pres Disch Line, kPag | N/A     | --- | 8000.00 | --- |
| Pres Ratio F/F        | 2.954   | --- | 3.224   | --- |
| Temp Suct, °C         | 25.00   | --- | 48.89   | --- |
| Temp Clr Disch, °C    | 48.89   | --- | 43.33   | --- |

#### Cylinder Data:

### Throw 2

### Throw 4

### Throw 1

### Throw 3

|                        | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
|------------------------|------------|------------|------------|------------|
| Cyl Model              | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
| Cyl Bore, in           | 4.750      | 4.750      | 3.000      | 3.000      |
| Cyl RDP (API), kPag    | 5421.8     | 5421.8     | 15983.3    | 15983.3    |
| Cyl MAWP, kPag         | 5964.0     | 5964.0     | 17581.6    | 17581.6    |
| Cyl Action             | DBL        | DBL        | DBL        | DBL        |
| Cyl Disp, CFM          | 107.6      | 107.6      | 41.1       | 41.1       |
| Pres Suct Intl, kPag   | 748.33     | 748.33     | 2348.14    | 2348.14    |
| Temp Suct Intl, °C     | 27         | 27         | 51         | 51         |
| Suct Zsph              | 0.9708     | 0.9708     | 0.9358     | 0.9358     |
| Pres Disch Intl, kPag  | 2621.60    | 2621.60    | 8369.96    | 8369.96    |
| Temp Disch Intl, °C    | 107        | 107        | 144        | 144        |
| HE Suct Gas Vel, FPM   | 6961       | 6961       | 6648       | 6648       |
| HE Disch Gas Vel, FPM  | 6311       | 6311       | 5931       | 5931       |
| HE Spcrs Used/Max      | 0/2        | 0/2        | 0/1        | 0/1        |
| HE Vol Pkt Avail, %    | 1.17+53.15 | 1.17+53.15 | 0.61+42.12 | 0.61+42.12 |
| Vol Pkt Used, %        | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   |
| HE Min Clr, %          | 18.77      | 18.77      | 18.29      | 18.29      |
| HE Total Clr, %        | 19.95      | 19.95      | 18.89      | 18.89      |
| CE Suct Gas Vel, FPM   | 6571       | 6571       | 5714       | 5714       |
| CE Disch Gas Vel, FPM  | 5957       | 5957       | 5097       | 5097       |
| CE Spcrs Used/Max      | 0/2        | 0/2        | 0/1        | 0/1        |
| CE Min Clr, %          | 20.36      | 20.36      | 22.17      | 22.17      |
| CE Total Clr, %        | 20.36      | 20.36      | 22.17      | 22.17      |
| Suct Vol Eff HE/CE, %  | 65.6/65.1  | 65.6/65.1  | 63.9/58.9  | 63.9/58.9  |
| Disch Event HE/CE, ms  | 5.5/6.3    | 5.5/6.3    | 5.2/5.7    | 5.2/5.7    |
| Suct Pseudo-Q HE/CE    | 5.3/4.7    | 5.3/4.7    | 4.4/3.3    | 4.4/3.3    |
| Gas Rod Ld Comp, lbf   | 4933 C     | 4933 C     | 6542 C     | 6542 C     |
| Gas Rod Ld Tens, lbf   | 4426 T     | 4426 T     | 4944 T     | 4944 T     |
| Gas Rod Ld Total, lbf  | 9359       | 9359       | 11486      | 11486      |
| Xhd Pin Deg/%Rvrsl lbf | 145/76.8   | 145/76.8   | 177/58.0   | 177/58.0   |
| Flow Calc, E3m3/D      | 24.477     | 24.477     | 24.477     | 24.477     |
| Cyl BHP                | 54.2       | 54.2       | 60.3       | 60.3       |





# Ariel Performance

Company: Collicutt Energy Services  
 Quote:  
 Case 31:

Customer: BP Canada  
 Inquiry: 05-25  
 Project: FH587



7.5.5

### Compressor Data:

|                  |        |                   |        |                   |       |
|------------------|--------|-------------------|--------|-------------------|-------|
| Elevation, ft:   | 4921.3 | Barmtr, kPaa:     | 84.389 | Ambient, °C:      | 38.00 |
| Frame:           | JGA/4  | Stroke, in:       | 3.00   | Rod Dia, in:      | 1.125 |
| Max RL Tot, lbf: | 20000  | Max RL Tens, lbf: | 10000  | Max RL Comp, lbf: | 11000 |
| Rated RPM:       | 1800   | Rated BHP:        | 560.0  | Rated PS FPM:     | 900.0 |
| Calc RPM:        | 1800.0 | Calc BHP:         | 259    | Calc PS FPM:      | 900.0 |

### Driver Data:

|        |           |
|--------|-----------|
| Type:  | Nat. Gas  |
| Mfg:   | Waukesha  |
| Model: | F18GL/GLD |
| BHP:   | 400       |
| Avail: | 375 (25)  |

### Services

#### Service 1

#### Stage Data:

|                       | #1      | --- | #2      | --- |
|-----------------------|---------|-----|---------|-----|
| Flow Req'd, E3m3/D    | 75.000  | --- | 75.000  | --- |
| Flow Calc, E3m3/D     | 55.840  | --- | 55.839  | --- |
| Cyl BHP per Stage     | 119.3   | --- | 127.9   | --- |
| Specific Gravity      | 0.7059  | --- | 0.7059  | --- |
| Ratio of Sp Ht (N)    | 1.2497  | --- | 1.2530  | --- |
| Comp Suct (Zs)        | 0.9667  | --- | 0.9292  | --- |
| Comp Disch (Zd)       | 0.9553  | --- | 0.9245  | --- |
| Pres Suct Line, kPag  | 900.00  | --- | N/A     | --- |
| Pres Suct Flg, kPag   | 890.16  | --- | 2643.13 | --- |
| Pres Disch Flg, kPag  | 2699.84 | --- | 8080.84 | --- |
| Pres Disch Line, kPag | N/A     | --- | 8000.00 | --- |
| Pres Ratio F/F        | 2.857   | --- | 2.994   | --- |
| Temp Suct, °C         | 25.00   | --- | 48.89   | --- |
| Temp Clr Disch, °C    | 48.89   | --- | 43.33   | --- |

#### Cylinder Data:

|                        | Throw 2    | Throw 4    | Throw 1    | Throw 3    |
|------------------------|------------|------------|------------|------------|
| Cyl Model              | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
| Cyl Bore, in           | 4.750      | 4.750      | 3.000      | 3.000      |
| Cyl RDP (API), kPag    | 5421.8     | 5421.8     | 15983.3    | 15983.3    |
| Cyl MAWP, kPag         | 5964.0     | 5964.0     | 17581.6    | 17581.6    |
| Cyl Action             | DBL        | DBL        | DBL        | DBL        |
| Disp, CFM              | 107.6      | 107.6      | 41.1       | 41.1       |
| Pres Suct Intl, kPag   | 842.30     | 842.30     | 2534.88    | 2534.88    |
| Temp Suct Intl, °C     | 27         | 27         | 51         | 51         |
| Suct Zsph              | 0.9675     | 0.9675     | 0.9309     | 0.9309     |
| Pres Disch Intl, kPag  | 2830.02    | 2830.02    | 8375.30    | 8375.30    |
| Temp Disch Intl, °C    | 105        | 105        | 138        | 138        |
| HE Suct Gas Vel, FPM   | 6961       | 6961       | 6648       | 6648       |
| HE Disch Gas Vel, FPM  | 6311       | 6311       | 5931       | 5931       |
| HE Spcrs Used/Max      | 0/2        | 0/2        | 0/1        | 0/1        |
| HE Vol Pkt Avail, %    | 1.17+53.15 | 1.17+53.15 | 0.61+42.12 | 0.61+42.12 |
| Vol Pkt Used, %        | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   |
| HE Min Clr, %          | 18.77      | 18.77      | 18.29      | 18.29      |
| HE Total Clr, %        | 19.95      | 19.95      | 18.89      | 18.89      |
| CE Suct Gas Vel, FPM   | 6571       | 6571       | 5714       | 5714       |
| CE Disch Gas Vel, FPM  | 5957       | 5957       | 5097       | 5097       |
| CE Spcrs Used/Max      | 0/2        | 0/2        | 0/1        | 0/1        |
| CE Min Clr, %          | 20.36      | 20.36      | 22.17      | 22.17      |
| CE Total Clr, %        | 20.36      | 20.36      | 22.17      | 22.17      |
| Suct Vol Eff HE/CE, %  | 67.0/66.4  | 67.0/66.4  | 67.0/62.5  | 67.0/62.5  |
| Disch Event HE/CE, ms  | 5.6/6.5    | 5.6/6.5    | 5.5/6.1    | 5.5/6.1    |
| Suct Pseudo-Q HE/CE    | 5.3/4.7    | 5.3/4.7    | 4.5/3.3    | 4.5/3.3    |
| Gas Rod Ld Comp, lbf   | 5242 C     | 5242 C     | 6383 C     | 6383 C     |
| Gas Rod Ld Tens, lbf   | 4689 T     | 4689 T     | 4758 T     | 4758 T     |
| Gas Rod Ld Total, lbf  | 9931       | 9931       | 11141      | 11141      |
| Xhd Pin Deg/%RvrsI lbf | 148/76.2   | 148/76.2   | 178/56.8   | 178/56.8   |
| Flow Calc, E3m3/D      | 27.920     | 27.920     | 27.920     | 27.920     |
| Cyl BHP                | 59.7       | 59.7       | 63.9       | 63.9       |





# Ariel Performance



Company: Collicutt Energy Services  
 Quote:  
 Case 32:

Customer: BP Canada  
 Inquiry: 05-25  
 Project: FH587

7.5.5

### Compressor Data:

|                  |               |                   |        |                   |              |
|------------------|---------------|-------------------|--------|-------------------|--------------|
| Elevation,ft:    | <u>4921.3</u> | Barmtr,kPaa:      | 84.389 | Ambient,°C:       | <u>38.00</u> |
| Frame:           | JGA/4         | Stroke, in:       | 3.00   | Rod Dia, in:      | 1.125        |
| Max RL Tot, lbf: | 20000         | Max RL Tens, lbf: | 10000  | Max RL Comp, lbf: | 11000        |
| Rated RPM:       | 1800          | Rated BHP:        | 560.0  | Rated PS FPM:     | 900.0        |
| Calc RPM:        | 1800.0        | Calc BHP:         | 276    | Calc PS FPM:      | 900.0        |

### Driver Data:

|        |           |
|--------|-----------|
| Type:  | Nat. Gas  |
| Mfg:   | Waukesha  |
| Model: | F18GL/GLD |
| BHP:   | 400       |
| Avail: | 375 (25)  |

### Services

#### Service 1

#### Stage Data:

|                       | #1      |     | #2      |     |
|-----------------------|---------|-----|---------|-----|
| Flow Req'd, E3m3/D    | 75.000  | --- | 75.000  | --- |
| Flow Calc, E3m3/D     | 62.793  | --- | 62.792  | --- |
| Cyl BHP per Stage     | 130.1   | --- | 133.9   | --- |
| Specific Gravity      | 0.7059  | --- | 0.7059  | --- |
| Ratio of Sp Ht (N)    | 1.2513  | --- | 1.2551  | --- |
| Comp Suct (Zs)        | 0.9633  | --- | 0.9244  | --- |
| Comp Disch (Zd)       | 0.9515  | --- | 0.9201  | --- |
| Pres Suct Line, kPag  | 1000.00 | --- | N/A     | --- |
| Pres Suct Flg, kPag   | 989.16  | --- | 2837.26 | --- |
| Pres Disch Flg, kPag  | 2896.78 | --- | 8080.84 | --- |
| Pres Disch Line, kPag | N/A     | --- | 8000.00 | --- |
| Pres Ratio F/F        | 2.777   | --- | 2.795   | --- |
| Temp Suct, °C         | 25.00   | --- | 48.89   | --- |
| Temp Clr Disch, °C    | 48.89   | --- | 43.33   | --- |

#### Cylinder Data:

#### Throw 2

#### Throw 4

#### Throw 1

#### Throw 3

|                         | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
|-------------------------|------------|------------|------------|------------|
| Cyl Model               | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
| Cyl Bore, in            | 4.750      | 4.750      | 3.000      | 3.000      |
| Cyl RDP (API), kPag     | 5421.8     | 5421.8     | 15983.3    | 15983.3    |
| Cyl MAWP, kPag          | 5964.0     | 5964.0     | 17581.6    | 17581.6    |
| Cyl Action              | DBL        | DBL        | DBL        | DBL        |
| Cyl Disp, CFM           | 107.6      | 107.6      | 41.1       | 41.1       |
| Pres Suct Intl, kPag    | 936.25     | 936.25     | 2720.65    | 2720.65    |
| Temp Suct Intl, °C      | 27         | 27         | 51         | 51         |
| Suct Zsph               | 0.9642     | 0.9642     | 0.9262     | 0.9262     |
| Pres Disch Intl, kPag   | 3037.37    | 3037.37    | 8380.44    | 8380.44    |
| Temp Disch Intl, °C     | 103        | 103        | 133        | 133        |
| HE Suct Gas Vel, FPM    | 6961       | 6961       | 6648       | 6648       |
| HE Disch Gas Vel, FPM   | 6311       | 6311       | 5931       | 5931       |
| HE Spcrrs Used/Max      | 0/2        | 0/2        | 0/1        | 0/1        |
| HE Vol Pkt Avail, %     | 1.17+53.15 | 1.17+53.15 | 0.61+42.12 | 0.61+42.12 |
| Vol Pkt Used, %         | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   |
| HE Min Clr, %           | 18.77      | 18.77      | 18.29      | 18.29      |
| HE Total Clr, %         | 19.95      | 19.95      | 18.89      | 18.89      |
| CE Suct Gas Vel, FPM    | 6571       | 6571       | 5714       | 5714       |
| CE Disch Gas Vel, FPM   | 5957       | 5957       | 5097       | 5097       |
| CE Spcrrs Used/Max      | 0/2        | 0/2        | 0/1        | 0/1        |
| CE Min Clr, %           | 20.36      | 20.36      | 22.17      | 22.17      |
| CE Total Clr, %         | 20.36      | 20.36      | 22.17      | 22.17      |
| Suct Vol Eff HE/CE, %   | 68.1/67.6  | 68.1/67.6  | 69.6/65.5  | 69.6/65.5  |
| Disch Event HE/CE, ms   | 5.7/6.6    | 5.7/6.6    | 5.8/6.5    | 5.8/6.5    |
| Suct Pseudo-Q HE/CE     | 5.3/4.7    | 5.3/4.7    | 4.5/3.3    | 4.5/3.3    |
| Gas Rod Ld Comp, lbf    | 5548 C     | 5548 C     | 6224 C     | 6224 C     |
| Gas Rod Ld Tens, lbf    | 4950 T     | 4950 T     | 4573 T     | 4573 T     |
| Gas Rod Ld Total, lbf   | 10498      | 10498      | 10797      | 10797      |
| Xhd Pin Deg/%Rvrrsl lbf | 164/77.0   | 164/77.0   | 178/55.9   | 178/55.9   |
| Flow Calc, E3m3/D       | 31.396     | 31.396     | 31.396     | 31.396     |
| Cyl BHP                 | 65.1       | 65.1       | 67.0       | 67.0       |





# Ariel Performance

Company: Collicutt Energy Services

Customer: BP Canada

Quote:

Inquiry: 05-25

7.5.5 Case 33:

Project: FH587



## Compressor Data:

|                  |               |                   |        |                   |              |
|------------------|---------------|-------------------|--------|-------------------|--------------|
| Elevation, ft:   | <u>4921.3</u> | Barmtr, kPaa:     | 84.389 | Ambient, °C:      | <u>38.00</u> |
| Frame:           | JGA/4         | Stroke, in:       | 3.00   | Rod Dia, in:      | 1.125        |
| Max RL Tot, lbf: | 20000         | Max RL Tens, lbf: | 10000  | Max RL Comp, lbf: | 11000        |
| Rated RPM:       | 1800          | Rated BHP:        | 560.0  | Rated PS FPM:     | 900.0        |
| Calc RPM:        | 1800.0        | Calc BHP:         | 292    | Calc PS FPM:      | 900.0        |

## Driver Data:

|        |           |
|--------|-----------|
| Type:  | Nat. Gas  |
| Mfg:   | Waukesha  |
| Model: | F18GL/GLD |
| BHP:   | 400       |
| Avail: | 375 (25)  |

## Services

### Stage Data:

|                       | Service 1<br>#1 |     | #2      |     |
|-----------------------|-----------------|-----|---------|-----|
| Flow Req'd, E3m3/D    | 75.000          | --- | 75.000  | --- |
| Flow Calc, E3m3/D     | 69.812          | --- | 69.812  | --- |
| Cyl BHP per Stage     | 140.8           | --- | 138.8   | --- |
| Specific Gravity      | 0.7059          | --- | 0.7059  | --- |
| Ratio of Sp Ht (N)    | 1.2528          | --- | 1.2572  | --- |
| Comp Suct (Zs)        | 0.9599          | --- | 0.9196  | --- |
| Comp Disch (Zd)       | 0.9478          | --- | 0.9159  | --- |
| Pres Suct Line, kPag  | 1100.00         | --- | N/A     | --- |
| Pres Suct Flg, kPag   | 1088.16         | --- | 3030.55 | --- |
| Pres Disch Flg, kPag  | 3092.75         | --- | 8080.84 | --- |
| Pres Disch Line, kPag | N/A             | --- | 8000.00 | --- |
| Pres Ratio F/F        | 2.710           | --- | 2.621   | --- |
| Temp Suct, °C         | 25.00           | --- | 48.89   | --- |
| Temp Clr Disch, °C    | 48.89           | --- | 43.33   | --- |

### Cylinder Data:

|                         | Throw 2    | Throw 4    | Throw 1    | Throw 3    |
|-------------------------|------------|------------|------------|------------|
| Cyl Model               | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
| Cyl Bore, in            | 4.750      | 4.750      | 3.000      | 3.000      |
| Cyl RDP (API), kPag     | 5421.8     | 5421.8     | 15983.3    | 15983.3    |
| Cyl MAWP, kPag          | 5964.0     | 5964.0     | 17581.6    | 17581.6    |
| Cyl Action              | DBL        | DBL        | DBL        | DBL        |
| Cyl Disp, CFM           | 107.6      | 107.6      | 41.1       | 41.1       |
| Pres Suct Intl, kPag    | 1030.16    | 1030.16    | 2905.53    | 2905.53    |
| Temp Suct Intl, °C      | 27         | 27         | 51         | 51         |
| Suct Zsph               | 0.9609     | 0.9609     | 0.9214     | 0.9214     |
| Pres Disch Intl, kPag   | 3243.76    | 3243.76    | 8385.44    | 8385.44    |
| Temp Disch Intl, °C     | 101        | 101        | 128        | 128        |
| HE Suct Gas Vel, FPM    | 6961       | 6961       | 6648       | 6648       |
| HE Disch Gas Vel, FPM   | 6311       | 6311       | 5931       | 5931       |
| HE Spcrrs Used/Max      | 0/2        | 0/2        | 0/1        | 0/1        |
| HE Vol Pkt Avail, %     | 1.17+53.15 | 1.17+53.15 | 0.61+42.12 | 0.61+42.12 |
| Vol Pkt Used, %         | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   |
| HE Min Clr, %           | 18.77      | 18.77      | 18.29      | 18.29      |
| HE Total Clr, %         | 19.95      | 19.95      | 18.89      | 18.89      |
| CE Suct Gas Vel, FPM    | 6571       | 6571       | 5714       | 5714       |
| CE Disch Gas Vel, FPM   | 5957       | 5957       | 5097       | 5097       |
| CE Spcrrs Used/Max      | 0/2        | 0/2        | 0/1        | 0/1        |
| CE Min Clr, %           | 20.36      | 20.36      | 22.17      | 22.17      |
| CE Total Clr, %         | 20.36      | 20.36      | 22.17      | 22.17      |
| Suct Vol Eff HE/CE, %   | 69.1/68.6  | 69.1/68.6  | 72.0/68.3  | 72.0/68.3  |
| Disch Event HE/CE, ms   | 5.8/6.8    | 5.8/6.8    | 6.1/6.9    | 6.1/6.9    |
| Suct Pseudo-Q HE/CE     | 5.3/4.7    | 5.3/4.7    | 4.5/3.3    | 4.5/3.3    |
| Gas Rod Ld Comp, lbf    | 5851 C     | 5851 C     | 6066 C     | 6066 C     |
| Gas Rod Ld Tens, lbf    | 5209 T     | 5209 T     | 4388 T     | 4388 T     |
| Gas Rod Ld Total, lbf   | 11060      | 11060      | 10454      | 10454      |
| Xhd Pin Deg/%Rvrrsl lbf | 167/77.1   | 167/77.1   | 179/54.7   | 179/54.7   |
| Flow Calc, E3m3/D       | 34.906     | 34.906     | 34.906     | 34.906     |
| Cyl BHP                 | 70.4       | 70.4       | 69.4       | 69.4       |





# Ariel Performance



Company: Collicutt Energy Services

Customer: BP Canada

Quote:

Inquiry: 05-25

7.5.5

Case 34:

Project: FH587

## Compressor Data:

|                  |               |                   |        |                   |              |
|------------------|---------------|-------------------|--------|-------------------|--------------|
| Elevation, ft:   | <u>4921.3</u> | Barmtr, kPaa:     | 84.389 | Ambient, °C:      | <u>38.00</u> |
| Frame:           | JGA/4         | Stroke, in:       | 3.00   | Rod Dia, in:      | 1.125        |
| Max RL Tot, lbf: | 20000         | Max RL Tens, lbf: | 10000  | Max RL Comp, lbf: | 11000        |
| Rated RPM:       | 1800          | Rated BHP:        | 560.0  | Rated PS FPM:     | 900.0        |
| Calc RPM:        | 1800.0        | Calc BHP:         | 306    | Calc PS FPM:      | 900.0        |

## Driver Data:

|        |           |
|--------|-----------|
| Type:  | Nat. Gas  |
| Mfg:   | Waukesha  |
| Model: | F18GL/GLD |
| BHP:   | 400       |
| Avail: | 375 (25)  |

## Services

### Service 1

#### Stage Data:

#### #1

|                       |         |
|-----------------------|---------|
| Flow Req'd, E3m3/D    | 75.000  |
| Flow Calc, E3m3/D     | 76.896  |
| Cyl BHP per Stage     | 151.3   |
| Specific Gravity      | 0.7059  |
| Ratio of Sp Ht (N)    | 1.2543  |
| Comp Suct (Zs)        | 0.9566  |
| Comp Disch (Zd)       | 0.9442  |
| Pres Suct Line, kPag  | 1200.00 |
| Pres Suct Flg, kPag   | 1187.16 |
| Pres Disch Flg, kPag  | 3287.83 |
| Pres Disch Line, kPag | N/A     |
| Pres Ratio F/F        | 2.652   |
| Temp Suct, °C         | 25.00   |
| Temp Clr Disch, °C    | 48.89   |

#### #2

|                       |         |
|-----------------------|---------|
| Flow Req'd, E3m3/D    | 75.000  |
| Flow Calc, E3m3/D     | 76.897  |
| Cyl BHP per Stage     | 142.6   |
| Specific Gravity      | 0.7059  |
| Ratio of Sp Ht (N)    | 1.2591  |
| Comp Suct (Zs)        | 0.9150  |
| Comp Disch (Zd)       | 0.9117  |
| Pres Suct Line, kPag  | N/A     |
| Pres Suct Flg, kPag   | 3223.05 |
| Pres Disch Flg, kPag  | 8080.84 |
| Pres Disch Line, kPag | 8000.00 |
| Pres Ratio F/F        | 2.469   |
| Temp Suct, °C         | 48.89   |
| Temp Clr Disch, °C    | 43.33   |

#### Cylinder Data:

#### Throw 2

#### Throw 4

#### Throw 1

#### Throw 3

|                        |            |            |            |            |
|------------------------|------------|------------|------------|------------|
| Cyl Model              | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
| Cyl Bore, in           | 4.750      | 4.750      | 3.000      | 3.000      |
| Cyl RDP (API), kPag    | 5421.8     | 5421.8     | 15983.3    | 15983.3    |
| Cyl MAWP, kPag         | 5964.0     | 5964.0     | 17581.6    | 17581.6    |
| Cyl Action             | DBL        | DBL        | DBL        | DBL        |
| Cyl Disp, CFM          | 107.6      | 107.6      | 41.1       | 41.1       |
| Pres Suct Intl, kPag   | 1124.03    | 1124.03    | 3089.57    | 3089.57    |
| Temp Suct Intl, °C     | 27         | 27         | 51         | 51         |
| Suct Zsph              | 0.9576     | 0.9576     | 0.9167     | 0.9167     |
| Pres Disch Intl, kPag  | 3449.26    | 3449.26    | 8390.30    | 8390.30    |
| Temp Disch Intl, °C    | 100        | 100        | 123        | 123        |
| HE Suct Gas Vel, FPM   | 6961       | 6961       | 6648       | 6648       |
| HE Disch Gas Vel, FPM  | 6311       | 6311       | 5931       | 5931       |
| HE Spcrrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| HE Vol Pkt Avail, %    | 1.17+53.15 | 1.17+53.15 | 0.61+42.12 | 0.61+42.12 |
| Vol Pkt Used, %        | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   |
| HE Min Clr, %          | 18.77      | 18.77      | 18.29      | 18.29      |
| HE Total Clr, %        | 19.95      | 19.95      | 18.89      | 18.89      |
| CE Suct Gas Vel, FPM   | 6571       | 6571       | 5714       | 5714       |
| CE Disch Gas Vel, FPM  | 5957       | 5957       | 5097       | 5097       |
| CE Spcrrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| CE Min Clr, %          | 20.36      | 20.36      | 22.17      | 22.17      |
| CE Total Clr, %        | 20.36      | 20.36      | 22.17      | 22.17      |
| Suct Vol Eff HE/CE, %  | 69.9/69.4  | 69.9/69.4  | 74.1/70.7  | 74.1/70.7  |
| Disch Event HE/CE, ms  | 5.9/6.9    | 5.9/6.9    | 6.4/7.1    | 6.4/7.1    |
| Suct Pseudo-Q HE/CE    | 5.3/4.8    | 5.3/4.8    | 4.5/3.3    | 4.5/3.3    |
| Gas Rod Ld Comp, lbf   | 6152 C     | 6152 C     | 5909 C     | 5909 C     |
| Gas Rod Ld Tens, lbf   | 5466 T     | 5466 T     | 4204 T     | 4204 T     |
| Gas Rod Ld Total, lbf  | 11618      | 11618      | 10113      | 10113      |
| Xhd Pin Deg/%Rvrsl lbf | 169/77.5   | 169/77.5   | 180/53.9   | 180/53.9   |
| Flow Calc, E3m3/D      | 38.448     | 38.448     | 38.448     | 38.448     |
| Cyl BHP                | 75.6       | 75.6       | 71.3       | 71.3       |





# Ariel Performance



Company: Collicutt Energy Services  
 Quote:  
 Case 35:

Customer: BP Canada  
 Inquiry: 05-25  
 Project: FH587

7.5.5

### Compressor Data:

Elevation, ft: 4921.3 Barmtr, kPaa: 84.389 Ambient, °C: 38.00  
 Frame: JGA/4 Stroke, in: 3.00 Rod Dia, in: 1.125  
 Max RL Tot, lbf: 20000 Max RL Tens, lbf: 10000 Max RL Comp, lbf: 11000  
 Rated RPM: 1800 Rated BHP: 560.0 Rated PS FPM: 900.0  
 Calc RPM: 1800.0 Calc BHP: 319 Calc PS FPM: 900.0

### Driver Data:

Type: Nat. Gas  
 Mfg: Waukesha  
 Model: F18GL/GLD  
 BHP: 400  
 Avail: 375 (25)

### Services

#### Stage Data:

|                       | Service 1 #1 | #2      |
|-----------------------|--------------|---------|
| Flow Req'd, E3m3/D    | 75.000       | 75.000  |
| Flow Calc, E3m3/D     | 84.046       | 84.046  |
| Cyl BHP per Stage     | 161.6        | 145.6   |
| Specific Gravity      | 0.7059       | 0.7059  |
| Ratio of Sp Ht (N)    | 1.2557       | 1.2610  |
| Comp Suct (Zs)        | 0.9532       | 0.9103  |
| Comp Disch (Zd)       | 0.9406       | 0.9076  |
| Pres Suct Line, kPag  | 1300.00      | N/A     |
| Pres Suct Flg, kPag   | 1286.16      | 3414.83 |
| Pres Disch Flg, kPag  | 3482.08      | 8080.84 |
| Pres Disch Line, kPag | N/A          | 8000.00 |
| Pres Ratio F/F        | 2.602        | 2.333   |
| Temp Suct, °C         | 25.00        | 48.89   |
| Temp Clr Disch, °C    | 48.89        | 43.33   |

#### Cylinder Data:

|                        | Throw 2    | Throw 4    | Throw 1    | Throw 3    |
|------------------------|------------|------------|------------|------------|
| Cyl Model              | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
| Cyl Bore, in           | 4.750      | 4.750      | 3.000      | 3.000      |
| Cyl RDP (API), kPag    | 5421.8     | 5421.8     | 15983.3    | 15983.3    |
| Cyl MAWP, kPag         | 5964.0     | 5964.0     | 17581.6    | 17581.6    |
| Cyl Action             | DBL        | DBL        | DBL        | DBL        |
| Disp, CFM              | 107.6      | 107.6      | 41.1       | 41.1       |
| Pres Suct Intl, kPag   | 1217.87    | 1217.87    | 3272.84    | 3272.84    |
| Temp Suct Intl, °C     | 27         | 27         | 51         | 51         |
| Suct Zsph              | 0.9543     | 0.9543     | 0.9121     | 0.9121     |
| Pres Disch Intl, kPag  | 3653.96    | 3653.96    | 8395.03    | 8395.03    |
| Temp Disch Intl, °C    | 99         | 99         | 119        | 119        |
| HE Suct Gas Vel, FPM   | 6961       | 6961       | 6648       | 6648       |
| HE Disch Gas Vel, FPM  | 6311       | 6311       | 5931       | 5931       |
| HE Spcrs Used/Max      | 0/2        | 0/2        | 0/1        | 0/1        |
| HE Vol Pkt Avail, %    | 1.17+53.15 | 1.17+53.15 | 0.61+42.12 | 0.61+42.12 |
| Vol Pkt Used, %        | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   |
| HE Min Clr, %          | 18.77      | 18.77      | 18.29      | 18.29      |
| HE Total Clr, %        | 19.95      | 19.95      | 18.89      | 18.89      |
| CE Suct Gas Vel, FPM   | 6571       | 6571       | 5714       | 5714       |
| CE Disch Gas Vel, FPM  | 5957       | 5957       | 5097       | 5097       |
| CE Spcrs Used/Max      | 0/2        | 0/2        | 0/1        | 0/1        |
| CE Min Clr, %          | 20.36      | 20.36      | 22.17      | 22.17      |
| CE Total Clr, %        | 20.36      | 20.36      | 22.17      | 22.17      |
| Suct Vol Eff HE/CE, %  | 70.6/70.2  | 70.6/70.2  | 75.9/72.8  | 75.9/72.8  |
| Disch Event HE/CE, ms  | 6.0/6.9    | 6.0/6.9    | 6.7/7.4    | 6.7/7.4    |
| Suct Pseudo-Q HE/CE    | 5.4/4.8    | 5.4/4.8    | 4.6/3.4    | 4.6/3.4    |
| Gas Rod Ld Comp, lbf   | 6452 C     | 6452 C     | 5752 C     | 5752 C     |
| Gas Rod Ld Tens, lbf   | 5720 T     | 5720 T     | 4021 T     | 4021 T     |
| Gas Rod Ld Total, lbf  | 12172      | 12172      | 9773       | 9773       |
| Xhd Pin Deg/%Rvrsl lbf | 170/78.1   | 170/78.1   | 179/53.8   | 179/53.8   |
| Flow Calc, E3m3/D      | 42.023     | 42.023     | 42.023     | 42.023     |
| Cyl BHP                | 80.8       | 80.8       | 72.8       | 72.8       |





# Ariel Performance



Company: Collicutt Energy Services

Customer: BP Canada

Quote:

Inquiry: 05-25

7.5.5

Case 36:

Project: FH587

### Compressor Data:

|                  |               |                   |        |                   |              |
|------------------|---------------|-------------------|--------|-------------------|--------------|
| Elevation, ft:   | <u>4921.3</u> | Barmtr, kPaa:     | 84.389 | Ambient, °C:      | <u>38.00</u> |
| Frame:           | JGA/4         | Stroke, in:       | 3.00   | Rod Dia, in:      | 1.125        |
| Max RL Tot, lbf: | 20000         | Max RL Tens, lbf: | 10000  | Max RL Comp, lbf: | 11000        |
| Rated RPM:       | 1800          | Rated BHP:        | 560.0  | Rated PS FPM:     | 900.0        |
| Calc RPM:        | 1800.0        | Calc BHP:         | 332    | Calc PS FPM:      | 900.0        |

### Driver Data:

|        |           |
|--------|-----------|
| Type:  | Nat. Gas  |
| Mfg:   | Waukesha  |
| Model: | F18GL/GLD |
| BHP:   | 400       |
| Avail: | 375 (25)  |

### Services

#### Service 1

#### Stage Data:

##### #1

|                       |         |
|-----------------------|---------|
| Flow Req'd, E3m3/D    | 75.000  |
| Flow Calc, E3m3/D     | 91.266  |
| Cyl BHP per Stage     | 171.9   |
| Specific Gravity      | 0.7060  |
| Ratio of Sp Ht (N)    | 1.2571  |
| Comp Suct (Zs)        | 0.9499  |
| Comp Disch (Zd)       | 0.9371  |
| Pres Suct Line, kPag  | 1400.00 |
| Pres Suct Flg, kPag   | 1385.16 |
| Pres Disch Flg, kPag  | 3675.09 |
| Pres Disch Line, kPag | N/A     |
| Pres Ratio F/F        | 2.558   |
| Temp Suct, °C         | 25.00   |
| Temp Clr Disch, °C    | 48.89   |

##### #2

|                       |         |
|-----------------------|---------|
| Flow Req'd, E3m3/D    | 75.000  |
| Flow Calc, E3m3/D     | 91.266  |
| Cyl BHP per Stage     | 147.6   |
| Specific Gravity      | 0.7060  |
| Ratio of Sp Ht (N)    | 1.2628  |
| Comp Suct (Zs)        | 0.9058  |
| Comp Disch (Zd)       | 0.9036  |
| Pres Suct Line, kPag  | N/A     |
| Pres Suct Flg, kPag   | 3606.14 |
| Pres Disch Flg, kPag  | 8080.84 |
| Pres Disch Line, kPag | 8000.00 |
| Pres Ratio F/F        | 2.212   |
| Temp Suct, °C         | 48.89   |
| Temp Clr Disch, °C    | 43.33   |

#### Cylinder Data:

##### Throw 2

##### Throw 4

##### Throw 1

##### Throw 3

|                        |            |            |            |            |
|------------------------|------------|------------|------------|------------|
| Cyl Model              | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
| Cyl Bore, in           | 4.750      | 4.750      | 3.000      | 3.000      |
| Cyl RDP (API), kPag    | 5421.8     | 5421.8     | 15983.3    | 15983.3    |
| Cyl MAWP, kPag         | 5964.0     | 5964.0     | 17581.6    | 17581.6    |
| Cyl Action             | DBL        | DBL        | DBL        | DBL        |
| Cyl Disp, CFM          | 107.6      | 107.6      | 41.1       | 41.1       |
| Pres Suct Intl, kPag   | 1311.67    | 1311.67    | 3455.58    | 3455.58    |
| Temp Suct Intl, °C     | 27         | 27         | 51         | 51         |
| Suct Zsph              | 0.9510     | 0.9510     | 0.9075     | 0.9075     |
| Pres Disch Intl, kPag  | 3857.43    | 3857.43    | 8399.68    | 8399.68    |
| Temp Disch Intl, °C    | 98         | 98         | 115        | 115        |
| HE Suct Gas Vel, FPM   | 6961       | 6961       | 6648       | 6648       |
| HE Disch Gas Vel, FPM  | 6311       | 6311       | 5931       | 5931       |
| HE Spcrrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| HE Vol Pkt Avail, %    | 1.17+53.15 | 1.17+53.15 | 0.61+42.12 | 0.61+42.12 |
| Vol Pkt Used, %        | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   |
| HE Min Clr, %          | 18.77      | 18.77      | 18.29      | 18.29      |
| HE Total Clr, %        | 19.95      | 19.95      | 18.89      | 18.89      |
| CE Suct Gas Vel, FPM   | 6571       | 6571       | 5714       | 5714       |
| CE Disch Gas Vel, FPM  | 5957       | 5957       | 5097       | 5097       |
| CE Spcrrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| CE Min Clr, %          | 20.36      | 20.36      | 22.17      | 22.17      |
| CE Total Clr, %        | 20.36      | 20.36      | 22.17      | 22.17      |
| Suct Vol Eff HE/CE, %  | 71.3/70.8  | 71.3/70.8  | 77.6/74.8  | 77.6/74.8  |
| Disch Event HE/CE, ms  | 6.1/7.0    | 6.1/7.0    | 6.9/7.8    | 6.9/7.8    |
| Suct Pseudo-Q HE/CE    | 5.4/4.8    | 5.4/4.8    | 4.6/3.4    | 4.6/3.4    |
| Gas Rod Ld Comp, lbf   | 6748 C     | 6748 C     | 5595 C     | 5595 C     |
| Gas Rod Ld Tens, lbf   | 5972 T     | 5972 T     | 3839 T     | 3839 T     |
| Gas Rod Ld Total, lbf  | 12720      | 12720      | 9434       | 9434       |
| Xhd Pin Deg/%Rvrsl lbf | 172/78.9   | 172/78.9   | 176/53.3   | 176/53.3   |
| Flow Calc, E3m3/D      | 45.633     | 45.633     | 45.633     | 45.633     |
| Cyl BHP                | 86.0       | 86.0       | 73.8       | 73.8       |



# Ariel Performance



Company: Collicutt Energy Services  
 Quote:  
 Case 37: 7.5.5

Customer: BP Canada  
 Inquiry: 05-25  
 Project: FH587



### Compressor Data:

|                  |        |                   |        |                   |       |
|------------------|--------|-------------------|--------|-------------------|-------|
| Elevation, ft:   | 4921.3 | Barmtr, kPaa:     | 84.389 | Ambient, °C:      | 38.00 |
| Frame:           | JGA/4  | Stroke, in:       | 3.00   | Rod Dia, in:      | 1.125 |
| Max RL Tot, lbf: | 20000  | Max RL Tens, lbf: | 10000  | Max RL Comp, lbf: | 11000 |
| Rated RPM:       | 1800   | Rated BHP:        | 560.0  | Rated PS FPM:     | 900.0 |
| Calc RPM:        | 1800.0 | Calc BHP:         | 201    | Calc PS FPM:      | 900.0 |

### Driver Data:

Type: Nat. Gas  
 Mfg: Waukesha  
 Model: F18GL/GLD  
 BHP: 400  
 Avail: 375 (25)

### Services

#### Stage Data:

|                       | Service 1 #1 |     | #2      |     |
|-----------------------|--------------|-----|---------|-----|
| Flow Req'd, E3m3/D    | 75.000       | --- | 75.000  | --- |
| Flow Calc, E3m3/D     | 34.843       | --- | 34.842  | --- |
| Cyl BHP per Stage     | 85.6         | --- | 103.1   | --- |
| Specific Gravity      | 0.7058       | --- | 0.7058  | --- |
| Ratio of Sp Ht (N)    | 1.2442       | --- | 1.2458  | --- |
| Comp Suct (Zs)        | 0.9768       | --- | 0.9428  | --- |
| Comp Disch (Zd)       | 0.9669       | --- | 0.9382  | --- |
| Pres Suct Line, kPag  | 600.00       | --- | N/A     | --- |
| Pres Suct Flg, kPag   | 593.16       | --- | 2099.79 | --- |
| Pres Disch Flg, kPag  | 2148.51      | --- | 8585.84 | --- |
| Pres Disch Line, kPag | N/A          | --- | 8500.00 | --- |
| Pres Ratio F/F        | 3.296        | --- | 3.970   | --- |
| Temp Suct, °C         | 25.00        | --- | 48.89   | --- |
| Temp Clr Disch, °C    | 48.89        | --- | 43.33   | --- |

#### Cylinder Data:

|                        | Throw 2    | Throw 4    | Throw 1    | Throw 3    |
|------------------------|------------|------------|------------|------------|
| Cyl Model              | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
| Cyl Bore, in           | 4.750      | 4.750      | 3.000      | 3.000      |
| Cyl RDP (API), kPag    | 5421.8     | 5421.8     | 15983.3    | 15983.3    |
| Cyl MAWP, kPag         | 5964.0     | 5964.0     | 17581.6    | 17581.6    |
| Actn                   | DBL        | DBL        | DBL        | DBL        |
| Disp, CFM              | 107.6      | 107.6      | 41.1       | 41.1       |
| Pres Suct Intl, kPag   | 560.27     | 560.27     | 2014.52    | 2014.52    |
| Temp Suct Intl, °C     | 28         | 28         | 52         | 52         |
| Suct Zsph              | 0.9774     | 0.9774     | 0.9446     | 0.9446     |
| Pres Disch Intl, kPag  | 2249.16    | 2249.16    | 8878.46    | 8878.46    |
| Temp Disch Intl, °C    | 114        | 114        | 160        | 160        |
| HE Suct Gas Vel, FPM   | 6961       | 6961       | 6648       | 6648       |
| HE Disch Gas Vel, FPM  | 6311       | 6311       | 5931       | 5931       |
| HE Spcrrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| HE Vol Pkt Avail, %    | 1.17+53.15 | 1.17+53.15 | 0.61+42.12 | 0.61+42.12 |
| Vol Pkt Used, %        | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   |
| HE Min Clr, %          | 18.77      | 18.77      | 18.29      | 18.29      |
| HE Total Clr, %        | 19.95      | 19.95      | 18.89      | 18.89      |
| CE Suct Gas Vel, FPM   | 6571       | 6571       | 5714       | 5714       |
| CE Disch Gas Vel, FPM  | 5957       | 5957       | 5097       | 5097       |
| CE Spcrrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| CE Min Clr, %          | 20.36      | 20.36      | 22.17      | 22.17      |
| CE Total Clr, %        | 20.36      | 20.36      | 22.17      | 22.17      |
| Suct Vol Eff HE/CE, %  | 60.9/60.2  | 60.9/60.2  | 54.4/47.9  | 54.4/47.9  |
| Disch Event HE/CE, ms  | 5.0/5.7    | 5.0/5.7    | 4.4/4.7    | 4.4/4.7    |
| Suct Pseudo-Q HE/CE    | 5.2/4.6    | 5.2/4.6    | 4.4/3.2    | 4.4/3.2    |
| Gas Rod Ld Comp, lbf   | 4431 C     | 4431 C     | 7360 C     | 7360 C     |
| Gas Rod Ld Tens, lbf   | 4007 T     | 4007 T     | 5731 T     | 5731 T     |
| Gas Rod Ld Total, lbf  | 8438       | 8438       | 13091      | 13091      |
| Xhd Pin Deg/%Rvrrs lbf | 142/81.7   | 142/81.7   | 176/64.7   | 176/64.7   |
| Flow Calc, E3m3/D      | 17.421     | 17.421     | 17.421     | 17.421     |
| Cyl BHP                | 42.8       | 42.8       | 51.5       | 51.5       |





# Ariel Performance

Company: Collicutt Energy Services  
 Quote:  
 Case 38:

Customer: BP Canada  
 Inquiry: 05-25  
 Project: FH587



### Compressor Data:

|                  |               |                   |        |                   |              |
|------------------|---------------|-------------------|--------|-------------------|--------------|
| Elevation, ft:   | <u>4921.3</u> | Barmtr, kPaa:     | 84.389 | Ambient, °C:      | <u>38.00</u> |
| Frame:           | JGA/4         | Stroke, in:       | 3.00   | Rod Dia, in:      | 1.125        |
| Max RL Tot, lbf: | 20000         | Max RL Tens, lbf: | 10000  | Max RL Comp, lbf: | 11000        |
| Rated RPM:       | 1800          | Rated BHP:        | 560.0  | Rated PS FPM:     | 900.0        |
| Calc RPM:        | 1800.0        | Calc BHP:         | 224    | Calc PS FPM:      | 900.0        |

### Driver Data:

|        |           |
|--------|-----------|
| Type:  | Nat. Gas  |
| Mfg:   | Waukesha  |
| Model: | F18GL/GLD |
| BHP:   | 400       |
| Avail: | 375 (25)  |

### Services

#### Service 1

#### Stage Data:

|                       | #1      | --- | #2      | --- |
|-----------------------|---------|-----|---------|-----|
| Flow Req'd, E3m3/D    | 75.000  | --- | 75.000  | --- |
| Flow Calc, E3m3/D     | 41.576  | --- | 41.576  | --- |
| Cyl BHP per Stage     | 97.4    | --- | 114.2   | --- |
| Specific Gravity      | 0.7058  | --- | 0.7058  | --- |
| Ratio of Sp Ht (N)    | 1.2461  | --- | 1.2483  | --- |
| Comp Suct (Zs)        | 0.9734  | --- | 0.9379  | --- |
| Comp Disch (Zd)       | 0.9629  | --- | 0.9335  | --- |
| Pres Suct Line, kPag  | 700.00  | --- | N/A     | --- |
| Pres Suct Flg, kPag   | 692.16  | --- | 2297.10 | --- |
| Pres Disch Flg, kPag  | 2349.26 | --- | 8585.84 | --- |
| Pres Disch Line, kPag | N/A     | --- | 8500.00 | --- |
| Pres Ratio F/F        | 3.134   | --- | 3.641   | --- |
| Temp Suct, °C         | 25.00   | --- | 48.89   | --- |
| Temp Clr Disch, °C    | 48.89   | --- | 43.33   | --- |

#### Cylinder Data:

#### Throw 2

#### Throw 4

#### Throw 1

#### Throw 3

|                        | 5-1/8JG         | 5-1/8JG         | 3JG             | 3JG             |
|------------------------|-----------------|-----------------|-----------------|-----------------|
| Cyl Model              | 5-1/8JG         | 5-1/8JG         | 3JG             | 3JG             |
| Cyl Bore, in           | 4.750           | 4.750           | 3.000           | 3.000           |
| Cyl RDP (API), kPag    | 5421.8          | 5421.8          | 15983.3         | 15983.3         |
| Cyl MAWP, kPag         | 5964.0          | 5964.0          | 17581.6         | 17581.6         |
| Cyl Action             | DBL             | DBL             | DBL             | DBL             |
| Cyl Disp, CFM          | 107.6           | 107.6           | 41.1            | 41.1            |
| Pres Suct Intl, kPag   | 654.32          | 654.32          | 2203.58         | 2203.58         |
| Temp Suct Intl, °C     | 28              | 28              | 52              | 52              |
| Suct Zsph              | 0.9741          | 0.9741          | 0.9396          | 0.9396          |
| Pres Disch Intl, kPag  | 2460.36         | 2460.36         | 8884.45         | 8884.45         |
| Temp Disch Intl, °C    | 111             | 111             | 153             | 153             |
| HE Suct Gas Vel, FPM   | 6961            | 6961            | 6648            | 6648            |
| HE Disch Gas Vel, FPM  | 6311            | 6311            | 5931            | 5931            |
| HE Spcra Used/Max      | 0/2             | 0/2             | 0/1             | 0/1             |
| HE Vol Pkt Avail, %    | 1.17+53.15      | 1.17+53.15      | 0.61+42.12      | 0.61+42.12      |
| Vol Pkt Used, %        | 0.00 (V)        | 0.00 (V)        | 0.00 (V)        | 0.00 (V)        |
| HE Min Clr, %          | 18.77           | 18.77           | 18.29           | 18.29           |
| HE Total Clr, %        | 19.95           | 19.95           | 18.89           | 18.89           |
| CE Suct Gas Vel, FPM   | 6571            | 6571            | 5714            | 5714            |
| CE Disch Gas Vel, FPM  | 5957            | 5957            | 5097            | 5097            |
| CE Spcra Used/Max      | 0/2             | 0/2             | 0/1             | 0/1             |
| CE Min Clr, %          | 20.36           | 20.36           | 22.17           | 22.17           |
| CE Total Clr, %        | 20.36           | 20.36           | 22.17           | 22.17           |
| Suct Vol Eff HE/CE, %  | 63.1/62.5       | 63.1/62.5       | 58.6/52.8       | 58.6/52.8       |
| Disch Event HE/CE, ms  | 5.2/6.0         | 5.2/6.0         | 4.6/5.2         | 4.6/5.2         |
| Suct Pseudo-Q HE/CE    | 5.2/4.7         | 5.2/4.7         | 4.4/3.3         | 4.4/3.3         |
| Gas Rod Ld Comp, lbf   | 4746 C          | 4746 C          | 7199 C          | 7199 C          |
| Gas Rod Ld Tens, lbf   | 4277 T          | 4277 T          | 5543 T          | 5543 T          |
| Gas Rod Ld Total, lbf  | 9023            | 9023            | 12742           | 12742           |
| Xhd Pin Deg/%Rvrsl lbf | <u>142/77.1</u> | <u>142/77.1</u> | <u>177/62.4</u> | <u>177/62.4</u> |
| Flow Calc, E3m3/D      | 20.788          | 20.788          | 20.788          | 20.788          |
| Cyl BHP                | 48.7            | 48.7            | 57.1            | 57.1            |



# Ariel Performance



Company: Collicutt Energy Services  
 Quote:  
 7.5.5 Case 39:

Customer: BP Canada  
 Inquiry: 05-25  
 Project: FH587



### Compressor Data:

|                  |               |                   |        |                   |              |
|------------------|---------------|-------------------|--------|-------------------|--------------|
| Elevation, ft:   | <u>4921.3</u> | Barmtr, kPaa:     | 84.389 | Ambient, °C:      | <u>38.00</u> |
| Frame:           | JGA/4         | Stroke, in:       | 3.00   | Rod Dia, in:      | 1.125        |
| Max RL Tot, lbf: | 20000         | Max RL Tens, lbf: | 10000  | Max RL Comp, lbf: | 11000        |
| Rated RPM:       | 1800          | Rated BHP:        | 560.0  | Rated PS FPM:     | 900.0        |
| Calc RPM:        | 1800.0        | Calc BHP:         | 245    | Calc PS FPM:      | 900.0        |

### Driver Data:

|        |           |
|--------|-----------|
| Type:  | Nat. Gas  |
| Mfg:   | Waukesha  |
| Model: | F18GL/GLD |
| BHP:   | 400       |
| Avail: | 375 (25)  |

### Services

#### Stage Data:

|                       | Service 1<br>#1 |     | #2      |     |
|-----------------------|-----------------|-----|---------|-----|
| Flow Req'd, E3m3/D    | 75.000          | --- | 75.000  | --- |
| Flow Calc, E3m3/D     | 48.383          | --- | 48.382  | --- |
| Cyl BHP per Stage     | 108.9           | --- | 123.7   | --- |
| Specific Gravity      | 0.7058          | --- | 0.7058  | --- |
| Ratio of Sp Ht (N)    | 1.2478          | --- | 1.2506  | --- |
| Comp Suct (Zs)        | 0.9700          | --- | 0.9329  | --- |
| Comp Disch (Zd)       | 0.9590          | --- | 0.9290  | --- |
| Pres Suct Line, kPag  | 800.00          | --- | N/A     | --- |
| Pres Suct Flg, kPag   | 791.16          | --- | 2493.29 | --- |
| Pres Disch Flg, kPag  | 2548.67         | --- | 8585.84 | --- |
| Pres Disch Line, kPag | N/A             | --- | 8500.00 | --- |
| Pres Ratio F/F        | 3.007           | --- | 3.364   | --- |
| Temp Suct, °C         | 25.00           | --- | 48.89   | --- |
| Temp Clr Disch, °C    | 48.89           | --- | 43.33   | --- |

#### Cylinder Data:

|                        | Throw 2    | Throw 4    | Throw 1    | Throw 3    |
|------------------------|------------|------------|------------|------------|
| Cyl Model              | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
| Cyl Bore, in           | 4.750      | 4.750      | 3.000      | 3.000      |
| Cyl RDP (API), kPag    | 5421.8     | 5421.8     | 15983.3    | 15983.3    |
| Cyl MAWP, kPag         | 5964.0     | 5964.0     | 17581.6    | 17581.6    |
| Cyl Action             | DBL        | DBL        | DBL        | DBL        |
| Disp, CFM              | 107.6      | 107.6      | 41.1       | 41.1       |
| Pres Suct Intl, kPag   | 748.33     | 748.33     | 2391.47    | 2391.47    |
| Temp Suct Intl, °C     | 27         | 27         | 51         | 51         |
| Suct Zsph              | 0.9708     | 0.9708     | 0.9347     | 0.9347     |
| Pres Disch Intl, kPag  | 2670.21    | 2670.21    | 8890.19    | 8890.19    |
| Temp Disch Intl, °C    | 108        | 108        | 147        | 147        |
| HE Suct Gas Vel, FPM   | 6961       | 6961       | 6648       | 6648       |
| HE Disch Gas Vel, FPM  | 6311       | 6311       | 5931       | 5931       |
| HE Spcrrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| HE Vol Pkt Avail, %    | 1.17+53.15 | 1.17+53.15 | 0.61+42.12 | 0.61+42.12 |
| Vol Pkt Used, %        | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   |
| HE Min Clr, %          | 18.77      | 18.77      | 18.29      | 18.29      |
| HE Total Clr, %        | 19.95      | 19.95      | 18.89      | 18.89      |
| CE Suct Gas Vel, FPM   | 6571       | 6571       | 5714       | 5714       |
| CE Disch Gas Vel, FPM  | 5957       | 5957       | 5097       | 5097       |
| CE Spcrrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| CE Min Clr, %          | 20.36      | 20.36      | 22.17      | 22.17      |
| CE Total Clr, %        | 20.36      | 20.36      | 22.17      | 22.17      |
| Suct Vol Eff HE/CE, %  | 64.9/64.3  | 64.9/64.3  | 62.2/56.9  | 62.2/56.9  |
| Disch Event HE/CE, ms  | 5.4/6.2    | 5.4/6.2    | 5.0/5.6    | 5.0/5.6    |
| Suct Pseudo-Q HE/CE    | 5.3/4.7    | 5.3/4.7    | 4.4/3.3    | 4.4/3.3    |
| Gas Rod Ld Comp, lbf   | 5059 C     | 5059 C     | 7040 C     | 7040 C     |
| Gas Rod Ld Tens, lbf   | 4544 T     | 4544 T     | 5356 T     | 5356 T     |
| Gas Rod Ld Total, lbf  | 9603       | 9603       | 12396      | 12396      |
| Xhd Pin Deg/%Rvrsl lbf | 145/77.6   | 145/77.6   | 177/60.4   | 177/60.4   |
| Flow Calc, E3m3/D      | 24.191     | 24.191     | 24.191     | 24.191     |
| Cyl BHP                | 54.4       | 54.4       | 61.9       | 61.9       |





# Ariel Performance



Company: Collicutt Energy Services

Customer: BP Canada

Quote:

Inquiry: 05-25

7.5.5

Case 40:

Project: FH587

## Compressor Data:

|                  |               |                   |        |                   |              |
|------------------|---------------|-------------------|--------|-------------------|--------------|
| Elevation, ft:   | <u>4921.3</u> | Barmtr, kPaa:     | 84.389 | Ambient, °C:      | <u>38.00</u> |
| Frame:           | JGA/4         | Stroke, in:       | 3.00   | Rod Dia, in:      | 1.125        |
| Max RL Tot, lbf: | 20000         | Max RL Tens, lbf: | 10000  | Max RL Comp, lbf: | 11000        |
| Rated RPM:       | 1800          | Rated BHP:        | 560.0  | Rated PS FPM:     | 900.0        |
| Calc RPM:        | 1800.0        | Calc BHP:         | 264    | Calc PS FPM:      | 900.0        |

## Driver Data:

|        |           |
|--------|-----------|
| Type:  | Nat. Gas  |
| Mfg:   | Waukesha  |
| Model: | F18GL/GLD |
| BHP:   | 400       |
| Avail: | 375 (25)  |

## Services

### Service 1

### Stage Data:

#### #1

---

#### #2

---

|                       |         |     |         |     |
|-----------------------|---------|-----|---------|-----|
| Flow Req'd, E3m3/D    | 75.000  | --- | 75.000  | --- |
| Flow Calc, E3m3/D     | 55.260  | --- | 55.260  | --- |
| Cyl BHP per Stage     | 120.0   | --- | 131.8   | --- |
| Specific Gravity      | 0.7059  | --- | 0.7059  | --- |
| Ratio of Sp Ht (N)    | 1.2495  | --- | 1.2528  | --- |
| Comp Suct (Zs)        | 0.9667  | --- | 0.9281  | --- |
| Comp Disch (Zd)       | 0.9552  | --- | 0.9246  | --- |
| Pres Suct Line, kPag  | 900.00  | --- | N/A     | --- |
| Pres Suct Flg, kPag   | 890.16  | --- | 2688.48 | --- |
| Pres Disch Flg, kPag  | 2746.91 | --- | 8585.84 | --- |
| Pres Disch Line, kPag | N/A     | --- | 8500.00 | --- |
| Pres Ratio F/F        | 2.905   | --- | 3.127   | --- |
| Temp Suct, °C         | 25.00   | --- | 48.89   | --- |
| Temp Clr Disch, °C    | 48.89   | --- | 43.33   | --- |

### Cylinder Data:

#### Throw 2

#### Throw 4

#### Throw 1

#### Throw 3

|                        |            |            |            |            |
|------------------------|------------|------------|------------|------------|
| Cyl Model              | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
| Cyl Bore, in           | 4.750      | 4.750      | 3.000      | 3.000      |
| Cyl RDP (API), kPag    | 5421.8     | 5421.8     | 15983.3    | 15983.3    |
| Cyl MAWP, kPag         | 5964.0     | 5964.0     | 17581.6    | 17581.6    |
| Cyl Action             | DBL        | DBL        | DBL        | DBL        |
| Cyl Disp, CFM          | 107.6      | 107.6      | 41.1       | 41.1       |
| Pres Suct Intl, kPag   | 842.31     | 842.31     | 2578.32    | 2578.32    |
| Temp Suct Intl, °C     | 27         | 27         | 51         | 51         |
| Suct Zsph              | 0.9675     | 0.9675     | 0.9299     | 0.9299     |
| Pres Disch Intl, kPag  | 2878.87    | 2878.87    | 8895.70    | 8895.70    |
| Temp Disch Intl, °C    | 106        | 106        | 142        | 142        |
| HE Suct Gas Vel, FPM   | 6961       | 6961       | 6648       | 6648       |
| HE Disch Gas Vel, FPM  | 6311       | 6311       | 5931       | 5931       |
| HE Spcrs Used/Max      | 0/2        | 0/2        | 0/1        | 0/1        |
| HE Vol Pkt Avail, %    | 1.17+53.15 | 1.17+53.15 | 0.61+42.12 | 0.61+42.12 |
| Vol Pkt Used, %        | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   |
| HE Min Clr, %          | 18.77      | 18.77      | 18.29      | 18.29      |
| HE Total Clr, %        | 19.95      | 19.95      | 18.89      | 18.89      |
| CE Suct Gas Vel, FPM   | 6571       | 6571       | 5714       | 5714       |
| CE Disch Gas Vel, FPM  | 5957       | 5957       | 5097       | 5097       |
| CE Spcrs Used/Max      | 0/2        | 0/2        | 0/1        | 0/1        |
| CE Min Clr, %          | 20.36      | 20.36      | 22.17      | 22.17      |
| CE Total Clr, %        | 20.36      | 20.36      | 22.17      | 22.17      |
| Suct Vol Eff HE/CE, %  | 66.3/65.8  | 66.3/65.8  | 65.3/60.5  | 65.3/60.5  |
| Disch Event HE/CE, ms  | 5.6/6.4    | 5.6/6.4    | 5.3/5.9    | 5.3/5.9    |
| Suct Pseudo-Q HE/CE    | 5.3/4.7    | 5.3/4.7    | 4.5/3.3    | 4.5/3.3    |
| Gas Rod Ld Comp, lbf   | 5368 C     | 5368 C     | 6880 C     | 6880 C     |
| Gas Rod Ld Tens, lbf   | 4808 T     | 4808 T     | 5170 T     | 5170 T     |
| Gas Rod Ld Total, lbf  | 10176      | 10176      | 12050      | 12050      |
| Xhd Pin Deg/%RvrsI lbf | 151/77.0   | 151/77.0   | 178/59.1   | 178/59.1   |
| Flow Calc, E3m3/D      | 27.630     | 27.630     | 27.630     | 27.630     |
| Cyl BHP                | 60.0       | 60.0       | 65.9       | 65.9       |





# Ariel Performance

Company: Collicutt Energy Services

Customer: BP Canada

Quote:

Inquiry: 05-25

7.5.5

Case 41:

Project: FH587



## Compressor Data:

|                  |        |                   |        |                   |       |
|------------------|--------|-------------------|--------|-------------------|-------|
| Elevation, ft:   | 4921.3 | Barmtr, kPaa:     | 84.389 | Ambient, °C:      | 38.00 |
| Frame:           | JGA/4  | Stroke, in:       | 3.00   | Rod Dia, in:      | 1.125 |
| Max RL Tot, lbf: | 20000  | Max RL Tens, lbf: | 10000  | Max RL Comp, lbf: | 11000 |
| Rated RPM:       | 1800   | Rated BHP:        | 560.0  | Rated PS FPM:     | 900.0 |
| Calc RPM:        | 1800.0 | Calc BHP:         | 282    | Calc PS FPM:      | 900.0 |

## Driver Data:

|        |           |
|--------|-----------|
| Type:  | Nat. Gas  |
| Mfg:   | Waukesha  |
| Model: | F18GL/GLD |
| BHP:   | 400       |
| Avail: | 375 (25)  |

## Services

### Service 1

#### Stage Data:

|                       | #1      |     | #2      |     |
|-----------------------|---------|-----|---------|-----|
| Flow Req'd, E3m3/D    | 75.000  | --- | 75.000  | --- |
| Flow Calc, E3m3/D     | 62.205  | --- | 62.205  | --- |
| Cyl BHP per Stage     | 130.9   | --- | 138.6   | --- |
| Specific Gravity      | 0.7059  | --- | 0.7059  | --- |
| Ratio of Sp Ht (N)    | 1.2511  | --- | 1.2549  | --- |
| Comp Suct (Zs)        | 0.9633  | --- | 0.9233  | --- |
| Comp Disch (Zd)       | 0.9514  | --- | 0.9203  | --- |
| Pres Suct Line, kPag  | 1000.00 | --- | N/A     | --- |
| Pres Suct Flg, kPag   | 989.16  | --- | 2882.72 | --- |
| Pres Disch Flg, kPag  | 2944.05 | --- | 8585.84 | --- |
| Pres Disch Line, kPag | N/A     | --- | 8500.00 | --- |
| Pres Ratio F/F        | 2.821   | --- | 2.922   | --- |
| Temp Suct, °C         | 25.00   | --- | 48.89   | --- |
| Temp Clr Disch, °C    | 48.89   | --- | 43.33   | --- |

#### Cylinder Data:

|                        | Throw 2    | Throw 4    | Throw 1    | Throw 3    |
|------------------------|------------|------------|------------|------------|
| Cyl Model              | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
| Cyl Bore, in           | 4.750      | 4.750      | 3.000      | 3.000      |
| Cyl RDP (API), kPag    | 5421.8     | 5421.8     | 15983.3    | 15983.3    |
| Cyl MAWP, kPag         | 5964.0     | 5964.0     | 17581.6    | 17581.6    |
| Cyl Action             | DBL        | DBL        | DBL        | DBL        |
| Disp, CFM              | 107.6      | 107.6      | 41.1       | 41.1       |
| Pres Suct Intl, kPag   | 936.25     | 936.25     | 2764.18    | 2764.18    |
| Temp Suct Intl, °C     | 27         | 27         | 51         | 51         |
| Suct Zsph              | 0.9642     | 0.9642     | 0.9251     | 0.9251     |
| Pres Disch Intl, kPag  | 3086.44    | 3086.44    | 8901.04    | 8901.04    |
| Temp Disch Intl, °C    | 104        | 104        | 137        | 137        |
| HE Suct Gas Vel, FPM   | 6961       | 6961       | 6648       | 6648       |
| HE Disch Gas Vel, FPM  | 6311       | 6311       | 5931       | 5931       |
| HE Spcrrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| HE Vol Pkt Avail, %    | 1.17+53.15 | 1.17+53.15 | 0.61+42.12 | 0.61+42.12 |
| Vol Pkt Used, %        | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   |
| HE Min Clr, %          | 18.77      | 18.77      | 18.29      | 18.29      |
| HE Total Clr, %        | 19.95      | 19.95      | 18.89      | 18.89      |
| CE Suct Gas Vel, FPM   | 6571       | 6571       | 5714       | 5714       |
| CE Disch Gas Vel, FPM  | 5957       | 5957       | 5097       | 5097       |
| CE Spcrrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| CE Min Clr, %          | 20.36      | 20.36      | 22.17      | 22.17      |
| CE Total Clr, %        | 20.36      | 20.36      | 22.17      | 22.17      |
| Suct Vol Eff HE/CE, %  | 67.5/67.0  | 67.5/67.0  | 68.0/63.7  | 68.0/63.7  |
| Disch Event HE/CE, ms  | 5.6/6.5    | 5.6/6.5    | 5.6/6.3    | 5.6/6.3    |
| Suct Pseudo-Q HE/CE    | 5.3/4.7    | 5.3/4.7    | 4.5/3.3    | 4.5/3.3    |
| Gas Rod Ld Comp, lbf   | 5674 C     | 5674 C     | 6722 C     | 6722 C     |
| Gas Rod Ld Tens, lbf   | 5069 T     | 5069 T     | 4985 T     | 4985 T     |
| Gas Rod Ld Total, lbf  | 10743      | 10743      | 11707      | 11707      |
| Xhd Pin Deg/%Rvrrs lbf | 165/77.6   | 165/77.6   | 179/57.8   | 179/57.8   |
| Flow Calc, E3m3/D      | 31.103     | 31.103     | 31.102     | 31.102     |
| Cyl BHP                | 65.5       | 65.5       | 69.3       | 69.3       |





# Ariel Performance

Company: Collicutt Energy Services

Customer: BP Canada

Quote:

Inquiry: 05-25

7.5.5

Case 42:

Project: FH587



## Compressor Data:

|                  |               |                   |        |                   |              |
|------------------|---------------|-------------------|--------|-------------------|--------------|
| Elevation,ft:    | <b>4921.3</b> | Barmtr,kPaa:      | 84.389 | Ambient,°C:       | <b>38.00</b> |
| Frame:           | JGA/4         | Stroke, in:       | 3.00   | Rod Dia, in:      | 1.125        |
| Max RL Tot, lbf: | 20000         | Max RL Tens, lbf: | 10000  | Max RL Comp, lbf: | 11000        |
| Rated RPM:       | 1800          | Rated BHP:        | 560.0  | Rated PS FPM:     | 900.0        |
| Calc RPM:        | 1800.0        | Calc BHP:         | 298    | Calc PS FPM:      | 900.0        |

## Driver Data:

|        |           |
|--------|-----------|
| Type:  | Nat. Gas  |
| Mfg:   | Waukesha  |
| Model: | F18GL/GLD |
| BHP:   | 400       |
| Avail: | 375 (25)  |

## Services

### Service 1

#### Stage Data:

#### #1

|                       |         |
|-----------------------|---------|
| Flow Req'd, E3m3/D    | 75.000  |
| Flow Calc, E3m3/D     | 69.218  |
| Cyl BHP per Stage     | 141.7   |
| Specific Gravity      | 0.7059  |
| Ratio of Sp Ht (N)    | 1.2527  |
| Comp Suct (Zs)        | 0.9599  |
| Comp Disch (Zd)       | 0.9477  |
| Pres Suct Line, kPag  | 1100.00 |
| Pres Suct Flg, kPag   | 1088.16 |
| Pres Disch Flg, kPag  | 3140.24 |
| Pres Disch Line, kPag | N/A     |
| Pres Ratio F/F        | 2.750   |
| Temp Suct, °C         | 25.00   |
| Temp Clr Disch, °C    | 48.89   |

#### #2

|                       |         |
|-----------------------|---------|
| Flow Req'd, E3m3/D    | 75.000  |
| Flow Calc, E3m3/D     | 69.218  |
| Cyl BHP per Stage     | 144.2   |
| Specific Gravity      | 0.7059  |
| Ratio of Sp Ht (N)    | 1.2569  |
| Comp Suct (Zs)        | 0.9185  |
| Comp Disch (Zd)       | 0.9161  |
| Pres Suct Line, kPag  | N/A     |
| Pres Suct Flg, kPag   | 3076.14 |
| Pres Disch Flg, kPag  | 8585.84 |
| Pres Disch Line, kPag | 8500.00 |
| Pres Ratio F/F        | 2.743   |
| Temp Suct, °C         | 48.89   |
| Temp Clr Disch, °C    | 43.33   |

#### Cylinder Data:

#### Throw 2

#### Throw 4

#### Throw 1

#### Throw 3

|                        |            |            |            |            |
|------------------------|------------|------------|------------|------------|
| Cyl Model              | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
| Cyl Bore, in           | 4.750      | 4.750      | 3.000      | 3.000      |
| Cyl RDP (API), kPag    | 5421.8     | 5421.8     | 15983.3    | 15983.3    |
| Cyl MAWP, kPag         | 5964.0     | 5964.0     | 17581.6    | 17581.6    |
| Cyl Action             | DBL        | DBL        | DBL        | DBL        |
| Cyl Disp, CFM          | 107.6      | 107.6      | 41.1       | 41.1       |
| Pres Suct Intl, kPag   | 1030.16    | 1030.16    | 2949.17    | 2949.17    |
| Temp Suct Intl, °C     | 27         | 27         | 51         | 51         |
| Suct Zsph              | 0.9609     | 0.9609     | 0.9204     | 0.9204     |
| Pres Disch Intl, kPag  | 3293.07    | 3293.07    | 8906.21    | 8906.21    |
| Temp Disch Intl, °C    | 103        | 103        | 132        | 132        |
| HE Suct Gas Vel, FPM   | 6961       | 6961       | 6648       | 6648       |
| HE Disch Gas Vel, FPM  | 6311       | 6311       | 5931       | 5931       |
| HE Spcra Used/Max      | 0/2        | 0/2        | 0/1        | 0/1        |
| HE Vol Pkt Avail, %    | 1.17+53.15 | 1.17+53.15 | 0.61+42.12 | 0.61+42.12 |
| Vol Pkt Used, %        | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   |
| HE Min Clr, %          | 18.77      | 18.77      | 18.29      | 18.29      |
| HE Total Clr, %        | 19.95      | 19.95      | 18.89      | 18.89      |
| CE Suct Gas Vel, FPM   | 6571       | 6571       | 5714       | 5714       |
| CE Disch Gas Vel, FPM  | 5957       | 5957       | 5097       | 5097       |
| CE Spcra Used/Max      | 0/2        | 0/2        | 0/1        | 0/1        |
| CE Min Clr, %          | 20.36      | 20.36      | 22.17      | 22.17      |
| CE Total Clr, %        | 20.36      | 20.36      | 22.17      | 22.17      |
| Suct Vol Eff HE/CE, %  | 68.5/68.0  | 68.5/68.0  | 70.4/66.5  | 70.4/66.5  |
| Disch Event HE/CE, ms  | 5.8/6.7    | 5.8/6.7    | 5.9/6.6    | 5.9/6.6    |
| Suct Pseudo-Q HE/CE    | 5.3/4.7    | 5.3/4.7    | 4.5/3.3    | 4.5/3.3    |
| Gas Rod Ld Comp, lbf   | 5978 C     | 5978 C     | 6564 C     | 6564 C     |
| Gas Rod Ld Tens, lbf   | 5328 T     | 5328 T     | 4800 T     | 4800 T     |
| Gas Rod Ld Total, lbf  | 11306      | 11306      | 11364      | 11364      |
| Xhd Pin Deg/%RvrsI lbf | 168/77.7   | 168/77.7   | 180/56.8   | 180/56.8   |
| Flow Calc, E3m3/D      | 34.609     | 34.609     | 34.609     | 34.609     |
| Cyl BHP                | 70.8       | 70.8       | 72.1       | 72.1       |





# Ariel Performance

Company: Collicutt Energy Services  
 Quote:  
 Case 43:

Customer: BP Canada  
 Inquiry: 05-25  
 Project: FH587



7.5.5

### Compressor Data:

|                  |        |                   |        |                   |       |
|------------------|--------|-------------------|--------|-------------------|-------|
| Elevation, ft:   | 4921.3 | Barmtr, kPaa:     | 84.389 | Ambient, °C:      | 38.00 |
| Frame:           | JGA/4  | Stroke, in:       | 3.00   | Rod Dia, in:      | 1.125 |
| Max RL Tot, lbf: | 20000  | Max RL Tens, lbf: | 10000  | Max RL Comp, lbf: | 11000 |
| Rated RPM:       | 1800   | Rated BHP:        | 560.0  | Rated PS FPM:     | 900.0 |
| Calc RPM:        | 1800.0 | Calc BHP:         | 313    | Calc PS FPM:      | 900.0 |

### Driver Data:

|        |           |
|--------|-----------|
| Type:  | Nat. Gas  |
| Mfg:   | Waukesha  |
| Model: | F18GL/GLD |
| BHP:   | 400       |
| Avail: | 375 (25)  |

### Services

#### Stage Data:

|                       | Service 1 #1 |     | #2      |     |
|-----------------------|--------------|-----|---------|-----|
| Flow Req'd, E3m3/D    | 75.000       | --- | 75.000  | --- |
| Flow Calc, E3m3/D     | 76.296       | --- | 76.296  | --- |
| Cyl BHP per Stage     | 152.2        | --- | 148.8   | --- |
| Specific Gravity      | 0.7059       | --- | 0.7059  | --- |
| Ratio of Sp Ht (N)    | 1.2542       | --- | 1.2589  | --- |
| Comp Suct (Zs)        | 0.9566       | --- | 0.9139  | --- |
| Comp Disch (Zd)       | 0.9441       | --- | 0.9119  | --- |
| Pres Suct Line, kPag  | 1200.00      | --- | N/A     | --- |
| Pres Suct Flg, kPag   | 1187.16      | --- | 3268.80 | --- |
| Pres Disch Flg, kPag  | 3335.55      | --- | 8585.84 | --- |
| Pres Disch Line, kPag | N/A          | --- | 8500.00 | --- |
| Pres Ratio F/F        | 2.690        | --- | 2.586   | --- |
| Temp Suct, °C         | 25.00        | --- | 48.89   | --- |
| Temp Clr Disch, °C    | 48.89        | --- | 43.33   | --- |

#### Cylinder Data:

|                       | Throw 2    | Throw 4    | Throw 1    | Throw 3    |
|-----------------------|------------|------------|------------|------------|
| Cyl Model             | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
| Cyl Bore, in          | 4.750      | 4.750      | 3.000      | 3.000      |
| Cyl RDP (API), kPag   | 5421.8     | 5421.8     | 15983.3    | 15983.3    |
| Cyl MAWP, kPag        | 5964.0     | 5964.0     | 17581.6    | 17581.6    |
| Cyl Action            | DBL        | DBL        | DBL        | DBL        |
| Cyl Disp, CFM         | 107.6      | 107.6      | 41.1       | 41.1       |
| Pres Suct Intl, kPag  | 1124.04    | 1124.04    | 3133.35    | 3133.35    |
| Temp Suct Intl, °C    | 27         | 27         | 51         | 51         |
| Suct Zsph             | 0.9576     | 0.9576     | 0.9157     | 0.9157     |
| Pres Disch Intl, kPag | 3498.83    | 3498.83    | 8911.24    | 8911.24    |
| Temp Disch Intl, °C   | 101        | 101        | 127        | 127        |
| HE Suct Gas Vel, FPM  | 6961       | 6961       | 6648       | 6648       |
| HE Disch Gas Vel, FPM | 6311       | 6311       | 5931       | 5931       |
| HE Spcrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| HE Vol Pkt Avail, %   | 1.17+53.15 | 1.17+53.15 | 0.61+42.12 | 0.61+42.12 |
| HE Vol Pkt Used, %    | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   |
| HE Min Clr, %         | 18.77      | 18.77      | 18.29      | 18.29      |
| HE Total Clr, %       | 19.95      | 19.95      | 18.89      | 18.89      |
| CE Suct Gas Vel, FPM  | 6571       | 6571       | 5714       | 5714       |
| CE Disch Gas Vel, FPM | 5957       | 5957       | 5097       | 5097       |
| CE Spcrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| CE Min Clr, %         | 20.36      | 20.36      | 22.17      | 22.17      |
| CE Total Clr, %       | 20.36      | 20.36      | 22.17      | 22.17      |
| Suct Vol Eff HE/CE, % | 69.4/68.9  | 69.4/68.9  | 72.6/68.9  | 72.6/68.9  |
| Disch Event HE/CE, ms | 5.9/6.8    | 5.9/6.8    | 6.2/6.9    | 6.2/6.9    |
| Suct Pseudo-Q HE/CE   | 5.3/4.8    | 5.3/4.8    | 4.5/3.4    | 4.5/3.4    |
| Gas Rod Ld Comp, lbf  | 6280 C     | 6280 C     | 6406 C     | 6406 C     |
| Gas Rod Ld Tens, lbf  | 5586 T     | 5586 T     | 4617 T     | 4617 T     |
| Gas Rod Ld Total, lbf | 11866      | 11866      | 11023      | 11023      |
| Xhd Pin Deg/%Rvrs lbf | 169/77.8   | 169/77.8   | 180/56.0   | 180/56.0   |
| Flow Calc, E3m3/D     | 38.148     | 38.148     | 38.148     | 38.148     |
| Cyl BHP               | 76.1       | 76.1       | 74.4       | 74.4       |





### Ariel Performance



Company: Collicutt Energy Services

Customer: BP Canada

Quote:

Inquiry: 05-25

7.5.5

Case 44:

Project: FH587

#### Compressor Data:

|                  |               |                   |        |                   |              |
|------------------|---------------|-------------------|--------|-------------------|--------------|
| Elevation,ft:    | <u>4921.3</u> | Barmtr,kPaa:      | 84.389 | Ambient,°C:       | <u>38.00</u> |
| Frame:           | JGA/4         | Stroke, in:       | 3.00   | Rod Dia, in:      | 1.125        |
| Max RL Tot, lbf: | 20000         | Max RL Tens, lbf: | 10000  | Max RL Comp, lbf: | 11000        |
| Rated RPM:       | 1800          | Rated BHP:        | 560.0  | Rated PS FPM:     | 900.0        |
| Calc RPM:        | 1800.0        | Calc BHP:         | 327    | Calc PS FPM:      | 900.0        |

#### Driver Data:

|        |           |
|--------|-----------|
| Type:  | Nat. Gas  |
| Mfg:   | Waukesha  |
| Model: | F18GL/GLD |
| BHP:   | 400       |
| Avail: | 375 (25)  |

#### Services

#### Service 1

##### Stage Data:

##### #1

##### #2

|                       |         |     |         |     |
|-----------------------|---------|-----|---------|-----|
| Flow Req'd, E3m3/D    | 75.000  | --- | 75.000  | --- |
| Flow Calc, E3m3/D     | 83.442  | --- | 83.442  | --- |
| Cyl BHP per Stage     | 162.7   | --- | 152.5   | --- |
| Specific Gravity      | 0.7059  | --- | 0.7059  | --- |
| Ratio of Sp Ht (N)    | 1.2556  | --- | 1.2607  | --- |
| Comp Suct (Zs)        | 0.9532  | --- | 0.9092  | --- |
| Comp Disch (Zd)       | 0.9405  | --- | 0.9078  | --- |
| Pres Suct Line, kPag  | 1300.00 | --- | N/A     | --- |
| Pres Suct Flg, kPag   | 1286.16 | --- | 3460.80 | --- |
| Pres Disch Flg, kPag  | 3529.75 | --- | 8585.84 | --- |
| Pres Disch Line, kPag | N/A     | --- | 8500.00 | --- |
| Pres Ratio F/F        | 2.637   | --- | 2.446   | --- |
| Temp Suct, °C         | 25.00   | --- | 48.89   | --- |
| Temp Clr Disch, °C    | 48.89   | --- | 43.33   | --- |

##### Cylinder Data:

##### Throw 2

##### Throw 4

##### Throw 1

##### Throw 3

|                        |            |            |            |            |
|------------------------|------------|------------|------------|------------|
| Cyl Model              | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
| Cyl Bore, in           | 4.750      | 4.750      | 3.000      | 3.000      |
| Cyl RDP (API), kPag    | 5421.8     | 5421.8     | 15983.3    | 15983.3    |
| Cyl MAWP, kPag         | 5964.0     | 5964.0     | 17581.6    | 17581.6    |
| Cyl Action             | DBL        | DBL        | DBL        | DBL        |
| Cyl Disp, CFM          | 107.6      | 107.6      | 41.1       | 41.1       |
| Pres Suct Intl, kPag   | 1217.87    | 1217.87    | 3316.82    | 3316.82    |
| Temp Suct Intl, °C     | 27         | 27         | 51         | 51         |
| Suct Zsph              | 0.9543     | 0.9543     | 0.9111     | 0.9111     |
| Pres Disch Intl, kPag  | 3703.49    | 3703.49    | 8916.16    | 8916.16    |
| Temp Disch Intl, °C    | 100        | 100        | 123        | 123        |
| HE Suct Gas Vel, FPM   | 6961       | 6961       | 6648       | 6648       |
| HE Disch Gas Vel, FPM  | 6311       | 6311       | 5931       | 5931       |
| HE Spcrrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| HE Vol Pkt Avail, %    | 1.17+53.15 | 1.17+53.15 | 0.61+42.12 | 0.61+42.12 |
| Vol Pkt Used, %        | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   |
| HE Min Clr, %          | 18.77      | 18.77      | 18.29      | 18.29      |
| HE Total Clr, %        | 19.95      | 19.95      | 18.89      | 18.89      |
| CE Suct Gas Vel, FPM   | 6571       | 6571       | 5714       | 5714       |
| CE Disch Gas Vel, FPM  | 5957       | 5957       | 5097       | 5097       |
| CE Spcrrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| CE Min Clr, %          | 20.36      | 20.36      | 22.17      | 22.17      |
| CE Total Clr, %        | 20.36      | 20.36      | 22.17      | 22.17      |
| Suct Vol Eff HE/CE, %  | 70.1/69.7  | 70.1/69.7  | 74.5/71.1  | 74.5/71.1  |
| Disch Event HE/CE, ms  | 6.0/6.9    | 6.0/6.9    | 6.5/7.2    | 6.5/7.2    |
| Suct Pseudo-Q HE/CE    | 5.4/4.8    | 5.4/4.8    | 4.6/3.4    | 4.6/3.4    |
| Gas Rod Ld Comp, lbf   | 6579 C     | 6579 C     | 6249 C     | 6249 C     |
| Gas Rod Ld Tens, lbf   | 5840 T     | 5840 T     | 4434 T     | 4434 T     |
| Gas Rod Ld Total, lbf  | 12419      | 12419      | 10683      | 10683      |
| Xhd Pin Deg/%RvrsI lbf | 171/78.0   | 171/78.0   | 180/55.4   | 180/55.4   |
| Flow Calc, E3m3/D      | 41.721     | 41.721     | 41.721     | 41.721     |
| Cyl BHP                | 81.4       | 81.4       | 76.3       | 76.3       |





# Ariel Performance

Company: Collicutt Energy Services  
 Quote:  
 Case 45:

Customer: BP Canada  
 Inquiry: 05-25  
 Project: FH587



7.5.5

### Compressor Data:

|                  |        |                   |        |                   |       |
|------------------|--------|-------------------|--------|-------------------|-------|
| Elevation, ft:   | 4921.3 | Barmtr, kPaa:     | 84.389 | Ambient, °C:      | 38.00 |
| Frame:           | JGA/4  | Stroke, in:       | 3.00   | Rod Dia, in:      | 1.125 |
| Max RL Tot, lbf: | 20000  | Max RL Tens, lbf: | 10000  | Max RL Comp, lbf: | 11000 |
| Rated RPM:       | 1800   | Rated BHP:        | 560.0  | Rated PS FPM:     | 900.0 |
| Calc RPM:        | 1800.0 | Calc BHP:         | 340    | Calc PS FPM:      | 900.0 |

### Driver Data:

|        |           |
|--------|-----------|
| Type:  | Nat. Gas  |
| Mfg:   | Waukesha  |
| Model: | F18GL/GLD |
| BHP:   | 400       |
| Avail: | 375 (25)  |

### Services

#### Stage Data:

|                       | Service 1 #1 |     | #2      |     |
|-----------------------|--------------|-----|---------|-----|
| Flow Req'd, E3m3/D    | 75.000       | --- | 75.000  | --- |
| Flow Calc, E3m3/D     | 90.673       | --- | 90.673  | --- |
| Cyl BHP per Stage     | 173.0        | --- | 155.3   | --- |
| Specific Gravity      | 0.7060       | --- | 0.7060  | --- |
| Ratio of Sp Ht (N)    | 1.2570       | --- | 1.2625  | --- |
| Comp Suct (Zs)        | 0.9499       | --- | 0.9046  | --- |
| Comp Disch (Zd)       | 0.9370       | --- | 0.9038  | --- |
| Pres Suct Line, kPag  | 1400.00      | --- | N/A     | --- |
| Pres Suct Flg, kPag   | 1385.16      | --- | 3652.71 | --- |
| Pres Disch Flg, kPag  | 3721.65      | --- | 8585.84 | --- |
| Pres Disch Line, kPag | N/A          | --- | 8500.00 | --- |
| Pres Ratio F/F        | 2.590        | --- | 2.320   | --- |
| Temp Suct, °C         | 25.00        | --- | 48.89   | --- |
| Temp Clr Disch, °C    | 48.89        | --- | 43.33   | --- |

#### Cylinder Data:

|                        | Throw 2    | Throw 4    | Throw 1    | Throw 3    |
|------------------------|------------|------------|------------|------------|
| Cyl Model              | 5-1/8JG    | 5-1/8JG    | 3JG        | 3JG        |
| Cyl Bore, in           | 4.750      | 4.750      | 3.000      | 3.000      |
| Cyl RDP (API), kPag    | 5421.8     | 5421.8     | 15983.3    | 15983.3    |
| Cyl MAWP, kPag         | 5964.0     | 5964.0     | 17581.6    | 17581.6    |
| Cyl Action             | DBL        | DBL        | DBL        | DBL        |
| Disp, CFM              | 107.6      | 107.6      | 41.1       | 41.1       |
| Pres Suct Intl, kPag   | 1311.67    | 1311.67    | 3500.10    | 3500.10    |
| Temp Suct Intl, °C     | 27         | 27         | 51         | 51         |
| Suct Zsph              | 0.9511     | 0.9511     | 0.9065     | 0.9065     |
| Pres Disch Intl, kPag  | 3905.81    | 3905.81    | 8920.99    | 8920.99    |
| Temp Disch Intl, °C    | 99         | 99         | 119        | 119        |
| HE Suct Gas Vel, FPM   | 6961       | 6961       | 6648       | 6648       |
| HE Disch Gas Vel, FPM  | 6311       | 6311       | 5931       | 5931       |
| HE Spcrrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| HE Vol Pkt Avail, %    | 1.17+53.15 | 1.17+53.15 | 0.61+42.12 | 0.61+42.12 |
| Vol Pkt Used, %        | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   | 0.00 (V)   |
| HE Min Clr, %          | 18.77      | 18.77      | 18.29      | 18.29      |
| HE Total Clr, %        | 19.95      | 19.95      | 18.89      | 18.89      |
| CE Suct Gas Vel, FPM   | 6571       | 6571       | 5714       | 5714       |
| CE Disch Gas Vel, FPM  | 5957       | 5957       | 5097       | 5097       |
| CE Spcrrs Used/Max     | 0/2        | 0/2        | 0/1        | 0/1        |
| CE Min Clr, %          | 20.36      | 20.36      | 22.17      | 22.17      |
| CE Total Clr, %        | 20.36      | 20.36      | 22.17      | 22.17      |
| Suct Vol Eff HE/CE, %  | 70.8/70.4  | 70.8/70.4  | 76.2/73.1  | 76.2/73.1  |
| Disch Event HE/CE, ms  | 6.1/6.9    | 6.1/6.9    | 6.7/7.5    | 6.7/7.5    |
| Suct Pseudo-Q HE/CE    | 5.4/4.8    | 5.4/4.8    | 4.6/3.4    | 4.6/3.4    |
| Gas Rod Ld Comp, lbf   | 6872 C     | 6872 C     | 6092 C     | 6092 C     |
| Gas Rod Ld Tens, lbf   | 6089 T     | 6089 T     | 4251 T     | 4251 T     |
| Gas Rod Ld Total, lbf  | 12961      | 12961      | 10343      | 10343      |
| Xhd Pin Deg/%RvrsI lbf | 172/78.1   | 172/78.1   | 179/54.5   | 179/54.5   |
| Flow Calc, E3m3/D      | 45.336     | 45.336     | 45.336     | 45.336     |
| Cyl BHP                | 86.5       | 86.5       | 77.7       | 77.7       |



