About JJ Tech


JJ Tech holds USA and selected foreign country patents on its line of NCPC Jet Pumps and products. This pump was developed to produce large volumes of sub-surface formation fluids with inclusions of moderate to high solid content.

The unique patented design allows easy retrieval of the pump from deviated and horizontal wells. Retrieval of the pump from the hole or replacement of the nozzle or expansion tube is done by manipulation of the surface valves and reverse circulation of fluid with the existing production equipment (plunger pump, surface SP). No wire line, pulling unit or work over rig is required.

These features, plus the larger flow area, direct fluid flow path and high production volumes give JJ Tech’s NCPC Jet Pump a marked advantage over existing designs of jet pumps and other types of artificial lift. The small size of the portion of the pump retrieved, referred to as “the carrier”, is 6.5 inches to 8.5 inches in length, making it very attractive to clients with highly deviated or horizontal wells which require artificial lift both on land and offshore.

NCPC Jet Pump Features

- **Smallest Jet Pump in the Industry**
  - OD 0.924 inches, length 6.635 inches
  - OD 1.173 inches, length 8.096 inches
- **High Flow Capacity**
  - Although small in physical size, the Coleman jet pump allows higher production rates due to low internal pressure drop
- **No Moving parts**
- **Enhances New Completion Technology**
  - The small size allows use in slim hole completions, highly deviated wells and horizontal applications
- **Efficient Installation and Handling**
  - No large lubricators or hoist requirements are required for installation or retrieval.
- **Simple**
  - Only Five parts in the pump assembly
Down Hole Technology

The pump utilizes the momentum of one fluid to move another fluid.

The pump consists of:

1. A nozzle to convert the pressure of the power fluid to velocity.
2. An intake that directs the produced fluid into the jet.
3. A mixing tube (throat) where the power fluid encounters the produced fluid and combines to reach some average velocity.
4. A diffuser where the velocity of the mixed stream is converted back to pressure, and is then produced up the annulus.
On The Surface

A JJ Tech wellhead, (or simple modifications of existing ones) can be easily made to reverse the carrier in and out of the well with only the closing and opening of valves.

Shown above, a JJ Tech high pressure surface pump and test separator for injection of power fluid, and a source to feed the surface unit in remote locations.
What JJ Tech Can Do For You

Hydraulic Jet Pump Analysis Software

• JJ Tech has exclusive software to determine the correct throat and nozzle assembly for your well.

• While the program computes every possible combination, it lets JJ Tech price equipment, and review different production rates without commitment from your company to purchase a jet pump system.

• Simply by filling out the well data sheet on the next page JJ Tech can find out what your well will produce with or without any expenditure.
### JET PUMP QUESTIONNAIRE

<table>
<thead>
<tr>
<th><strong>NEW COLEMAN PUMP COMPANY</strong></th>
<th><strong>Fax #</strong> 501.562.2960</th>
<th><strong>JET PUMP QUESTIONNAIRE</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>COMPANY</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>WELL IDENTIFICATION</strong></td>
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<td><strong>LEASE/WELL #</strong></td>
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<tr>
<td><strong>PUMP DEPTH, feet</strong></td>
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<td><strong>STATIC FLUID LEVEL, feet</strong></td>
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<td><strong>TUBING ID, inches</strong></td>
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<td><strong>TUBING LENGTH TO PUMP, feet</strong></td>
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<td><strong>TUBING OD, inches</strong></td>
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<tr>
<td><strong>CASING ID, inches</strong></td>
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<td><strong>POWER FLUID, water or oil</strong></td>
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<tr>
<td><strong>BH TEMP. degrees F</strong></td>
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<td><strong>FLOWING WH TEMP. degrees F</strong></td>
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<tr>
<td><strong>GAS/LIQUID RATIO, scf/h</strong></td>
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<td><strong>DESIGN PRODUCTION, b/day</strong></td>
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<tr>
<td><strong>PRODUCTION RETURN</strong></td>
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<td><strong>PRODUCED OIL GRAVITY, API</strong></td>
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<td><strong>PRODUCED WATER Sp. Grav.</strong></td>
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<td><strong>PRODUCED GAS, Sp. Gravity (Air = 1)</strong></td>
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<td><strong>WATER CUT, fraction</strong></td>
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<td><strong>SURFACE HYDR. PRESSURE, psi</strong></td>
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<tr>
<td><strong>DESIRE, F.W.H. PRESS. psi</strong></td>
<td></td>
<td><strong>PERFORATIONS DEPTH, feet</strong></td>
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<tr>
<td><strong>WELL PL, b/day / psi</strong></td>
<td></td>
<td><strong>BHSP (psi) &amp; DATA DEPTH (feet)</strong></td>
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</table>

**PLEASE, SUPPLY COLEMAN WITH A BOTTOM HOLE COMPLETION ASSEMBLY SCHEMATIC, COMPLETE WITH DEPTHS IN FEET AND ID'S IN INCHES.**

**PLEASE, FILL IN ALL THE BLANKS WITH THE LATEST WELL DATA KNOWN.**

( **NOTE:** Well Data may be given in Metric Measurements, Please Specify)

**THANK YOU FOR THE WELL DATA SUPPLIED, NEW COLEMAN PUMP COMPANY**
Items for plumbing:
- 4 2" HP Tees
- 3 2" HP Ball Plugs
- 4 2" 3000 psi Ball Valves
- 1 HP 2" cross
- 1 hp 2" Full Open Ball Valve
- Assorted 2" nipples

Note: Use 2 3/8 tubing for vertical run. Vertical I.D. should be minimum 1.995 inches. Also use only tees and ball plugs for corners not 90's.
Armstrong Oil Enterprises

7123 I-30 Suite 38
Little Rock, AR  72223

800.264.6316 / 501.562.2960 fax
### THE NEW COLEMAN PUMP COMPANY

#### Input Data

- **COMPANY:** Ray Walsmith
- **LEASE:** Tulsa
- **WELL IDENTIFICATION:** 1
- **TUBING LENGTH TO PUMP:** 2000 Feet
- **PUMP DEPTH:** 2000 Feet
- **TUBING ID:** 2.991 Inches
- **TUBING OD:** 3.5 Inches
- **Casing ID.:** 5 Inches
- **BH TEMP.:** 111 Deg F
- **GAS LIQ. RATIO:** 130 SCF/BBL
- **PROD. RETURN:** Annulus
- **PROD. WATER GRAV.:** (Sp.Gr.) 1.06
- **WAT. FRAC.:** (50% = 0.50) 0.95
- **PUMPING BHP:** 300 psig
- **LEASE:** Tulsa
- **REPRESENTATIVE:** Otis A.
- **TUBING LENGTH TO PUMP:** 2000 Feet
- **POWER FLUID:** Water
- **FLOWING WH TEMP.:** 110 Deg F
- **DESIGN LIQ. PROD. RATE:** 5000 BBL/DAY
- **PRODUCED OIL GRAVITY:** 27.9 API
- **PRODUCED GAS GRAVITY:** 0.751
- **SURFACE HYD. PRESS.:** 3700 psig
- **FLOWING WH PRESS.:** 40 psig
- **Date:** 22 - March - 2005

#### Computed Output Data - English Units

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<th>Pump Size</th>
<th>Power Press psig</th>
<th>Power Fluid Rate bblpd</th>
<th>Horse Power</th>
<th>Horse Rate bblpd</th>
<th>Non-Cav Prod. Rate bblpd</th>
<th>Non-Cav Rate psig</th>
<th>Pumping Bot-hole</th>
<th>Nozzle Area inches</th>
<th>Throat Area inches</th>
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**Hydraulic Jet Pump Analysis**
A new solution to an old problem!

Introduction

A recent evolution in artificial lift utilizes concentric 1.25” I.J. tubing and jet pump technology for gas well dewatering operations. The implications of this novel adaptation are quite significant.

In the Water Lift Gas Well Dewatering System, the inner 1.25” I.J. tubing string is used to power a downhole jet pump, returning produced wellbore fluids and power fluid up a concentric 1.25” I.J. tubing annulus through to the surface production equipment. This system allows for consistent draw-down of the reservoir. Benefits include "Dry Gas" flow performance and production characteristics.
**Background**

Jet pumps are a proven technology used in various well configurations to artificially lift liquids from under-pressured reservoirs. The principals are quite simple. Based on a venturi effect, system fluid pressure is converted into a high-energy jet stream, creating low pressure at the pump intake. Subsequently, the flow enters a profiled diffuser section which converts the jet kinetic energy into pressure which is harnessed to drive fluid to surface.

Taking this technology one step further, the Water lift process combines a small jet pump jet pump with 1.25" I.J. tubing inside 2-7/8 tubing which is run in gas wells. The well can then flow gas up the annulus between the Water lift string and the completion (which is not liquid-loaded).
**Down Hole Technology**

The pump utilizes the momentum of one fluid to move another fluid.

The pump consist of :

(1) A nozzle to convert the pressure of the power fluid to velocity.

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