

# LPS NEWSLETTER

## CONTINUOUS ROD AND TUBING LINER UPDATE

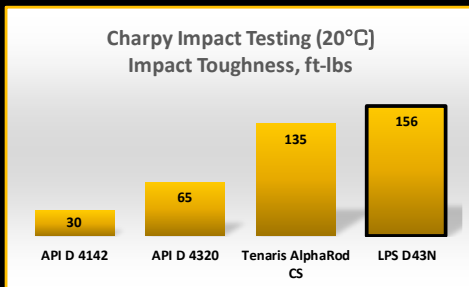


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### MANUFACTURING

#### 4318 Qualification

The qualification of the LightningRod™ 4318 product line was completed in the summer of 2019. LPS now offers D43N and H43N grades of continuous rod with added nickel to increase resistance to corrosion.



The “Charpy Impact Testing” graph tested by an independent 3rd party lab shows LightningRod™ to have superior toughness compared with industry standard rods.

### SERVICE GUARANTEE

When you include LightningRod™ continuous rod in your well design, the LPS Service Guarantee assures that you will have LPS coiled rod service equipment and crew (TMX or RSU) at your well site within 24 hours. Call us for more details.

### Alternative to ESPs:

#### LPS Continuous Rods Makes Long-Stroke Pumping Units Viable in Deep Wells

ESP is an inefficient production method below 1000 barrels of fluid per day (bfpd), but sucker rod pumping has traditionally not been able to move more than 300 bfpd from below 8,000 ft. LPS is addressing this weakness by combining continuous rod with a long-stroke pumping unit in these wells.

Several LPS clients are using our continuous rod with long-stroke units producing fluid rates that are not possible with conventional pumping methods. The lack of rod guides in continuous rod strings makes the friction in the wellbore significantly lower, allowing the operator to produce more fluid. The following example is a case with a pump set at 8,000 ft in a wellbore with high side loads near the top of the string.

	Conventional	Fiberglass	Long Stroke Steel	Long Stroke Continuous
Production, BFPD	300	400	615	775
Pump Bore Size, in	2"	2"	2"	2.25"
Taper Size	86	86	87	97
Gearbox Load	102%	78%	77%	87%
Rod Load	89%	97%	100%	85%
PPRL, lbs	40,098	34,731	44,265	48,569
MPRL, lbs	11,317	9,441	13,189	13,262

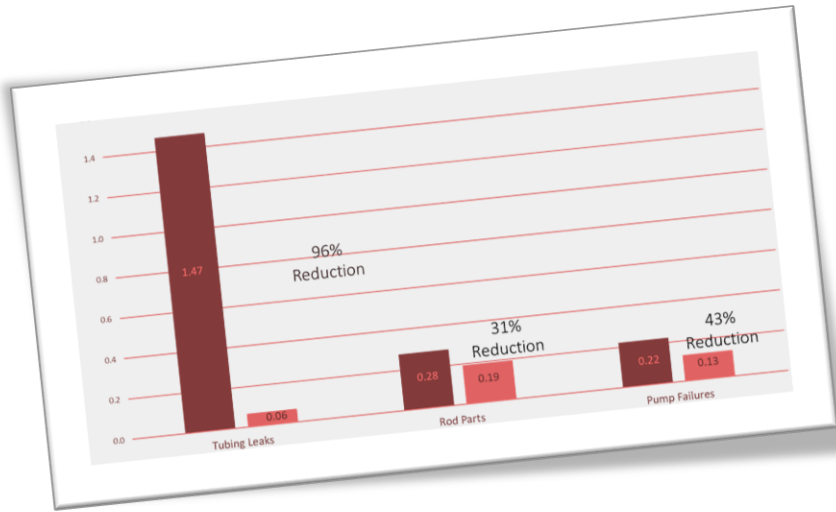
The long stroke continuous rod case can produce 475 additional bfpd when compared to a conventional geometry unit with stick rod. This allows the operator to convert to rod pumping earlier in the life of the well, eliminating a costly ESP workover and avoiding the issues with low rate ESP inefficiency.

### Local Distribution

Just-in-time (JIT) delivery is vital for customers, especially when a high-rate well goes down. LPS has made a significant investment in 2019 to stock inventory (rod and lined tubing) as close to our customers as possible. LPS stocks commonly used rod & tubing sizes in Houston, Midland, and Bakersfield. We build custom rod strings in any of these locations, enabling customers to get their wells back on-line as quickly as possible.

With service locations in Midland/Odessa, TX and Bakersfield, CA we have expanded our capabilities by investing in a new TMX, field forge welder, micro plant, six-meter reels, pipe transport trailer, and a shop wheel loader. Additionally, we have upgraded all our injectors, retrofitting them to the latest technology offered by Celtic Pride which has proven to provide more reliable uptime.

# LightningFlo™ Case Study



LPS has worked with an operator in West Texas with both product lines. LightningFlo™ lined tubing was installed in 13 wells in the Permian Basin from September 2016 to the end of 2018. These wells had major deviation, causing a high failure rate. The average well depth was 11,500'. Wells used a combination of continuous rod and lined tubing.

The results show a dramatic decrease in failure rate when using LightningFlo™ lined tubing. The tubing failures were nearly eliminated entirely, and a slight improvement was seen in both the rod and pump failure rates. The reduction in failure gave the operator an average savings of \$134,400/well/year in workover costs alone.

The drastic increase in performance resulted in the operator implementing a field wide lined tubing plan. Any well with 2+ failures in the previous 12 months and making less than 250 bpd of fluid is now equipped with LPS lined tubing.



## Performance KPIs

### Delivering a Positive ROI

Lined tubing and continuous rod have proven to be effective in reducing the negative effects of rod on tubing wear.

The primary failure mechanism in LightningRod™ continuous rod has been corrosion enhanced rod wear. LPS has not had any failures to date primarily attributed to manufacturing defects. LPS quality specifications exceed industry standards in all aspects, and this has been reflected in the performance of our products.

LPS not only has extended the run times for many of its customers with exceptional product performance, but we also are reducing downtime by guaranteeing quick service when needed. Our service guarantee helps customers feel confident they can get their wells back on production quickly, reducing deferred production in the event of a failure.

