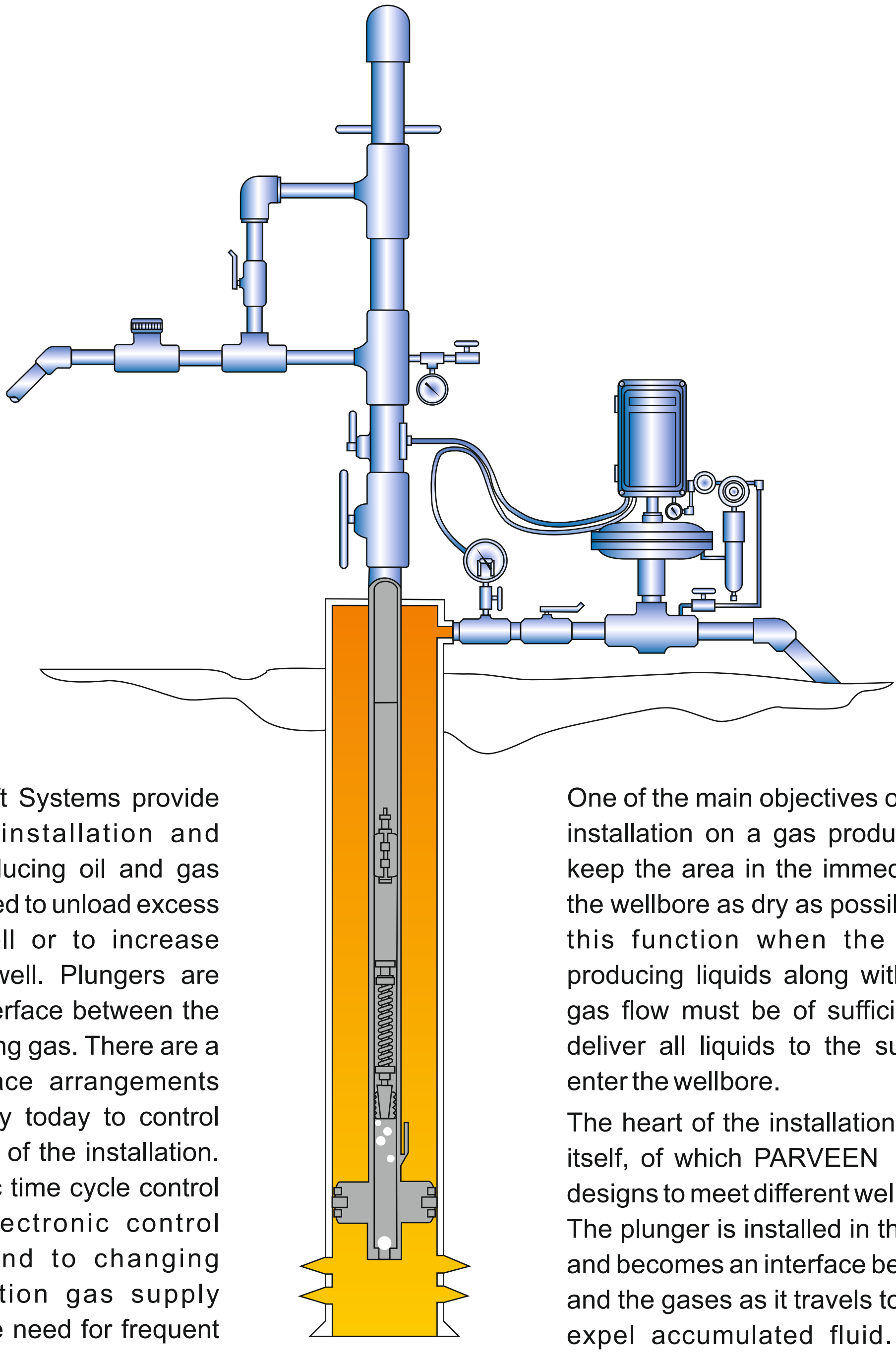
PLUNGER LIFT SYSTEMS



PARVEEN Plunger Lift Systems provide operators with low installation and operating cost for producing oil and gas wells. These are designed to unload excess fluids from a gas well or to increase production on an oil well. Plungers are designed as a solid interface between the fluid column and the lifting gas. There are a large number of surface arrangements being used successfully today to control fluid lifting performance of the installation. These range from basic time cycle control to more complex electronic control methods that respond to changing downhole and injection gas supply conditions, reducing the need for frequent inspection to maintain optimum installation operation.

Plunger Lift is ideal for: (1) improving the efficiency of intermittent gas lift (2) removing liquid from gas wells (3) producing high GOR wells/solution gas drive reservoirs and (4) preventing paraffin and/or scale buildup.

One of the main objectives of a Plunger Lift installation on a gas producing well is to keep the area in the immediate vicinity of the wellbore as dry as possible. To perform this function when the formation is producing liquids along with the gas, the gas flow must be of sufficient velocity to deliver all liquids to the surface as they enter the wellbore.

The heart of the installation is the plunger itself, of which PARVEEN offers several designs to meet different well requirements. The plunger is installed in the tubing string and becomes an interface between the fluid and the gases as it travels to the surface to expel accumulated fluid. The plunger movement is the result of a cyclic operation that creates a differential across the plunger. This is normally accomplished by opening and closing a motor valve with a time cycle controller such as the auto controller.

TEMPERATURE CORRECTION FACTOR $T_f = \sqrt{\frac{520}{T_v + 460}}$

TEMP. °F	T_f	TEMP. °F	T_f	TEMP. °F	T_f
60	1.000	130	.939	195	.891
65	.995	135	.935	200	.888
70	.990	140	.931	205	.885
75	.986	145	.927	210	.881
80	.981	150	.923	215	.878
85	.977	155	.920	220	.875
90	.972	160	.916	225	.872
100	.964	165	.912	230	.868
105	.959	170	.909	235	.865
110	.955	175	.905	240	.862
115	.951	180	.902	245	.859
120	.947	185	.898	250	.857
125	.943	190	.894		

USEFUL GAS LIFT VALVE EQUATIONS USING API SYMBOLS

$$\frac{A_p}{A_b} = \frac{P_{iod} - P_{vc}}{P_{iod} - P_{pd}}$$

$$P_{iod} = \frac{P_{vc} - (A_p / A_b)\,P_{bd}}{1 - (A_p / A_b)}$$

$$P_{pef} = \frac{A_p}{A_b - A_p} = \frac{A_p / A_b}{1 - (A_p / A_b)}$$

$$P_{pd} = \frac{P_{vc} - P_{iod}\,(1 - (A_p / A_b))}{A_p / A_b}$$

$$P_{vo} = \frac{P_{vc}}{1 - (A_p / A_b)}$$

$$P_{vc} = P_{iod} - (A_p / A_b\,(P_{iod} - P_{pd})$$

Where: A_b = bellows area, in^2
A_p = area of seat or port – ball seat contact, in^2
P_{iod} = operating gas injection pressure at valve, psig
P_{pd} = operating production pressure at valve, psig
P_{pef} = production pressure effect factor (formerly Spm or TEF
P_{vc} = valve closing pressure, psig
P_{vo} = test rack set opening pressure, psig (formerly Ptro)