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Jack Rabbit Pretest 2021E PT4 Photonic Doppler Velocimetry Data

Mark M. Hart, Oliver T. Strand, Stephen T. Bosson,
Randal A. Bonner and D. M. Hester

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The predictive accuracy of a high explosive model cannot be proven.

Except..... by experiment.

- Hart

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I want to thank all those who contributed to the success of the Jack Rabbit Pretest series. The encouragement, counsel, criticism, and support both technical and financial, all worked together in developing a successful series of tests and a very rich harvest of data.

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Secondly, none of the data you will see in this report would exist, were it not for the extraordinary skill and resourcefulness of the firing crew, technicians, and engineers working at the Contained Firing Facility (CFF) at Site 300, LLNL. After the countless meetings, presentations, design reviews, engineering design, parts fabrication, and experiment assembly, the process funneled down to a small group of experts who delivered the payoff of accurate data. They are to be commended for their work and accomplishments in executing the Jack Rabbit Pretest focused hydrodynamic experiments.

Mark M. Hart

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ABSTRACT

The Jack Rabbit Pretest (PT) 2021E PT4 was fired on March 19, 2008 at the Contained Firing Facility, Site 300, Lawrence Livermore National Laboratory. This experiment is part of an effort to determine the properties of LX-17 in a regime where corner-turning behavior and dead-zone formation are not well understood. Photonic Doppler Velocimetry (PDV) measured diagnostic plate velocities confirming the presence of a persistent LX-17 dead-zone formation and the resultant impulse gradient applied under the diagnostic plate.

EXECUTIVE SUMMARY

The Jack Rabbit Pretest 2021E PT4, 120 millimeter diameter experiment returned data on all eight PDV probes. The probes measured on the central axis and at 10, 20, 25, 30, 35, 40, 50 millimeters from the central axis. The experiment was shot at an ambient room temperature of 64 degrees Fahrenheit. The earliest PDV signal extinction was 44.9 microseconds at 30 millimeters. The latest PDV signal extinction time was 69.5 microseconds at 10 millimeters. The measured velocity ranged from meters per second to thousands of meters per second. First detonation wave induced jump-off was measured at 50 millimeters at 13.3 microseconds. The PDV data provided an unambiguous indication of dead-zone formation and an impulse gradient applied to the diagnostic plate. The central axis had a last measured velocity of 1558 meters per second. At 40 millimeters the last measured velocity was 2019 meters per second. The low-to-high velocity ratio was 0.77. Velocity data was integrated to compute diagnostic plate cross section profiles. Velocity data was differentiated to compute a peak pressure under the diagnostic plate at the central axis of 98.6 kilobars at 15.0 microseconds. Substantial motion (>1 m/s) of the diagnostic plate over the dead-zone is followed by detonation region motion within approximately 0.7 microseconds.

INTRODUCTION

The Photonic Doppler Velocimeter (PDV), also known as the Heterodyne Velocimeter, was fielded on each of the five Jack Rabbit Pretest Series. The PDV system is described in a Review of Scientific Instruments article.¹ Briefly, the PDV uses single mode fiber optic components to mix the Doppler-shifted light from a moving surface with undoppler-shifted light from the laser to generate a beat signal. The frequency of the beat signal is directly proportional to the velocity according to:

$$f_b = 2\left(\frac{v}{c}\right)f_0$$

where f_b is the beat frequency, v is the velocity of the moving surface, c is the speed of light and f_0 is the original frequency of the laser. The PDV system uses lasers with a wavelength of 1550 nanometers, so a velocity of 1000 meters per second yields a beat frequency of 1.29 GHz.

Figure 1. Example (2021E PT3) of shot stand with PDV probes sighted on diagnostic plate

¹ O.T. Strand, et.al, Compact System For High-Speed Velocimetry Using Heterodyne Techniques, Review Of Scientific Instruments 77, 083208 (2006)

There were eight channels of data recorded on each test where each channel corresponded to a probe mounted above the diagnostic plate. Each probe monitored the velocity time history of a discrete spatial location on the surface of the diagnostic plate. The probes used were a standard type commonly used by PDV. They were commercially available probes made by Oz Optics of Ottawa, Canada, and had a focal distance of 97 mm (part #LPF-04-1550-9/125-S-15-97-6.2AS-40-3A-3-5-SP). The probes were actually mounted a distance of 102 mm above the surface to enable the probe to follow the surface for a longer distance of travel. The distance from the center of the plate for each probe on each shot is shown in the table below:

Table 1. Probe location for all Jack Rabbit Pretest Experiments

Probe #	Distance from center (mm)				
	2021E PT3	2021E PT4	2021E PT5	2021E PT6	2021E PT7
1	00	00	00	00	00
2	10	10	20	20	20
3	20	20	30	30	30
4	25	25	35	35	35
5	30	30	45	45	45
6	35	35	55	55	55
7	40	40	65	65	65
8	50	50	75	75	75

The PDV data was recorded by high-bandwidth, high-sample rate digitizers that operated at a sample rate of 20 gigasamples per second. The beat waveforms were processed using two different methods. The early time data corresponding to velocities below approximately 20 meters per second were processed using a fringe counting method. This method uses the fact that the surface moves 775 nanometers for each beat cycle. For velocities above approximately 20 meters per second, a sliding Fourier transform method was used with a window length of 1024 points, which is 51 nanoseconds of sample time. The velocity profiles were then mapped onto a timebase with 100 nanoseconds per point using a linear

interpolation of the original points and are shown in Tabulated Diagnostic Plate Velocities, Table 3. The final velocity profiles were then integrated to obtain the diagnostic plate displacement versus time profiles shown in Figure 10, also with a timebase of 100 nanoseconds per point. The displacement versus time profile data is shown in Table 4.

The timebases given in the spreadsheets are referenced to the time of the CDU (fireset) current start. The timing corrections from the PDV digitizers to the measurement point on the diagnostic plate were determined by taking into account the various fiber and cable delays in the system. The timing loop used to make the timebase corrections is shown in Figure 2.

Figure 2. Jack Rabbit Pretest Experiment Timing Diagram

The times are given in nanoseconds. Moving around the loop starting at the fireset CDU yields the following equation:

$$12 + t_{\text{shot}} + 186 + 16 + 5 - t_{\text{pdv}} - 288 + 288 + t_{\text{fidpdv}} - 288 + 288 + t_{\text{fids}} - 20 - 4 - 264 = 0$$

$$12 + t_{\text{shot}} + 186 + 16 + 5 - t_{\text{pdv}} + t_{\text{fidpdv}} + t_{\text{fids}} - 20 - 4 - 264 = 0$$

$$t_{\text{shot}} = t_{\text{pdv}} - t_{\text{fidpdv}} - t_{\text{fids}} + 69$$

where t_{shot} is the time of interest at the diagnostic plate with respect to the CDU current start. The variable t_{pdv} is the time interval from the timing fid recorded by the PDV system to the event of interest in the velocity data. The variable t_{fidpdv} is the time interval from the PDV fid to the fireset fid, and t_{fidds} is the time interval from the fireset fid to the fireset CDU. Completing this loop shows that the total correction due to the various cable and fiber delays is 69 nanoseconds.

There are three velocity plots associated with each test:

- 1) short time axis giving details about the early-time motion on a semi-log plot, Figure 7,
- 2) intermediate time axis showing the early time motion of all the probes on a linear plot, Figure 8,
- 3) long time axis showing the entire data record on a linear plot, Figure 9.

In the velocity plots, the PDV channel numbers are identified by combining the number of the shot with the distance from the center. For example, the velocity profile for probe #3 on shot 2021E PT4 is v420, and the velocity profile for probe #6 on 2021E PT7 is v755. In one case, probe #5 of 2021E PT3 showed a break in the velocity time history at 13 μs , so the plots for 2021E PT3 show two velocity curves for that probe and they are labeled v3301 and v3302. Finally, the diagnostic plate displacement versus time data was extracted at 5 microsecond intervals and then transposed to obtain displacement versus radius profiles at 5 microsecond increments. The resulting displacement profiles are shown in Figure 10.

As a final look at the data, an attempt was made to infer what magnitude of pressure the center of the diagnostic plate experienced during the earliest part of each shot. The semi-log velocity versus time plot for each shot shows that the center probe recorded a fairly long and slow-rising velocity profile, rather than a shocked profile, Figure 7. Differentiating these velocity profiles yields the accelerations, which are related to the pressures. Deriving an expression for the

pressure is fairly straightforward. Start with

$$F = ma = \rho h A a$$

where F is the applied force on the aluminum diagnostic plate, m is the mass of the plate, ρ is the density of aluminum = 2.79 grams/cubic centimeter, h is the thickness of the plate = 6 millimeters, A is the area over which the force is applied, and a is the acceleration obtained by differentiating the velocity. The pressure P is the force per unit area:

$$P = \frac{F}{A} = \rho h a$$

Inserting the numerical values yields:

$$P[\text{kbar}] = (1.62 \times 10^{-7}) \times a[\text{m/s}^2]$$

The above expression applies only to a system in which the entire 6 millimeter plate accelerates as a solid body, and does not take into account shock compressions that would make the surface move in a manner different from the bulk motion. To compensate for that, the velocity time histories were smoothed with a 1.1 microsecond sliding average, which is approximately the sound speed transit time through the 6 millimeter thickness of the aluminum diagnostic plate, before differentiating to obtain the acceleration. In the pressure plot of Figure 11, the thin red curve is the actual velocity profile, the thick red curve is the smoothed velocity profile, and the blue curve is the pressure obtained by differentiating the thick red curve.

2021E PT4**DESCRIPTION**

2021E PT4 used a 76 millimeter thick cylindrical charge of LX-17, 120 millimeters in diameter, Figure 2. The charge was parted along a plane 30 millimeters from the top. The detonator flat cable, piezoelectric diagnostic pin, and embedded fiberoptic line were run through the parting line in the explosive charge. The main-charge diameter of this experiment was limited in the Jack Rabbit Pretest to ensure transparency for x-radiography imaging, while being large enough in diameter to permit transition from dead-zone to detonation wave contact on the aluminum diagnostic flyer plate. 2021E PT4 contained a 43 millimeter diameter, 10 millimeter thick, 303 stainless steel shadowplate. It was embedded on the central axis and within the cylindrical LX-17 main-charge. The shadowplate contained a PETN LX-16 pellet that fired downward, initiating an ultrafine TATB (UFTATB) hemispherical booster.

Figure 3. Graphic Cross Section of Jack Rabbit Pretest 2021E PT4

The charge was sandwiched between two 6 millimeter thick circular aluminum plates of the same diameter. The upper aluminum diagnostic flyer plate (diagnostic plate) monitored the progression of the detonation using x-ray imaging, framing camera imaging, and photonic Doppler velocimetry (PDV). Eight PDV probes were sighted down onto the diagnostic plate for measuring jump-off time and velocity as the diagnostic plate was accelerated in response to the detonation of the LX-17, Figure 1. The PDV laser beams were sighted within ± 0.25 millimeter of the nominal radial position. For purposes of positioning the probes in close quarters, the monitored positions were laid out along two orthogonal axes on the diagnostic plate surface, Figure 4. These PDV sighting locations were on lines clocked 45 degrees out from the location of the embedded piezoelectric timing pin, detonator cable, and fiberoptic diagnostic cable (not used in this test) to avoid their potential influence on the progression of the detonation wave. The PDV sighting positions on the aluminum plate were prepared by impressing a lightly textured steel ball on the aluminum surface for optimal laser beam reflection, Figure 6. The radial PDV positions were assigned to closely monitor anticipated regions of interest as shown in ARES simulations. The 2021E PT4, 120 millimeter experiment was monitored at radial distances of 0, 10, 20, 25, 30, 35, 40, and 50 millimeters.

Figure 4. Schematic cross section of Jack Rabbit Pretest 2021E PT4, dimensions in millimeters

Booster: UFTATB, 25.8 g

Main charge: LX-17, 1578.0 g

Upper charge mass: 618.4 g

Lower charge mass: 959.6 g

Upper charge density: 1.902 g/cc

Lower charge density: 1.900 g/cc

Main charge temperature: 17.8C (64F)

PDV measurement positions: 0, 10, 20, 25, 30, 35, 40, 50 mm

Figure 5. PDV measurement locations on 2021E PT4 aluminum diagnostic plate, dimensions in millimeters

Figure 6. Example (2021E PT4) of a diagnostic plate showing circular spots prepared for optimal laser beam reflection

DIAGNOSTIC PLATE VELOCITY PLOTS

Figure 7. Short Time Axis Velocity Plot of Jack Rabbit Pretest 2021E PT4; time is referenced from detonator circuit current start

Figure 8. Intermediate Time Axis Velocity Plot of Jack Rabbit Pretest 2021E PT4; time is referenced from detonator circuit current start

Table 2. PDV measurement positions and signal extinction times for 2021E PT4 (μs); time is referenced from detonator circuit current start

00 mm	10 mm	20 mm	25 mm	30 mm	35 mm	40 mm	50 mm
				44.9			
			58.1				
		59.4					
					61.1		
							62.3
						63.0	
68.8							
	69.5

Figure 9. Long Time Axis Velocity Plot of Jack Rabbit Pretest 2021E PT4; time is referenced from detonator circuit current start

DIAGNOSTIC PLATE DISPLACEMENT PROFILES

Figure 10. Diagnostic Plate Displacement Profiles of Jack Rabbit Pretest 2021E PT4; time is referenced from detonator circuit current start

CYLINDRICAL AXIS DEAD-ZONE PRESSURE PLOT

Figure 11. Dead-Zone Pressure Plot of Jack Rabbit Pretest 2021E PT4; time is referenced from detonator circuit current start

DIAGNOSTIC PLATE VELOCITY TABLE

Table 3. Tabulated Diagnostic Plate Velocities of Jack Rabbit Pretest 2021E PT4; time is referenced from detonator circuit current start

Jack Rabbit Pretest 2021E PT4 VELOCITY Data								
Columnar data: meters per second								
absolute timing accuracy relative to time zero = +/- 0.025 microseconds								
relative timing uncertainty between data channels = +/- 0.005 microseconds								
z velocity uncertainty = +/- 5 percent of velocity								
PDV measurement point position uncertainty = +/- 0.25 millimeters								
r →	0	10	20	25	30	35	40	50
t								
12	0	0	0	0	0	0	0	0
12.1	0	0	0	0	0	0	0	0
12.2	0	0	0	0	0	0	0	0
12.3	0	0	0	0	0	0	0	0
12.4	0	0	0	0	0	0	0	0
12.5	0	0	0	0	0	0	0	0
12.6	1.0148	0	0	0	0	0	0	0
12.7	1.3666	0	0	0	0	0	0	0
12.8	1.7184	0	0	0	0	0	0	0
12.9	2.0844	0	0	0	0	0	0	0
13	2.5068	0	0	0	0	0	0	0
13.1	2.8825	0	0	0	0	0	0	0
13.2	3.197	0	0	0	0	0	0	0
13.3	3.4375	1.3658	0	0	0	0	0	2394.2
13.4	3.6432	1.5973	0	0	0	0	0	2300.2
13.5	3.6788	1.8289	0	0	0	0	0	2230.1
13.6	3.6634	1.9768	0	0	0	0	0	2226.3
13.7	3.8134	2.1175	0	0	0	0	0	2210.7
13.8	3.8572	2.24	0	0	0	0	0	2199
13.9	3.8464	2.3565	0	0	0	0	1152.7	2197.5
14	3.8556	2.4544	0	0	0	0	1955.5	2191.2
14.1	3.9119	2.5438	0	54.767	49.545	0	1885.7	2188.3
14.2	4.0651	2.6314	46.113	119.31	224.02	0	1860.9	2186.8
14.3	4.1181	2.753	297.85	589.77	607.33	64.776	1857.2	2178.8
14.4	4.4205	3.0277	609.84	612.9	624.19	662.28	1850.7	2178.5
14.5	4.5751	3.6884	616.79	633.35	642.24	681.5	1840.6	2182.6
14.6	7.3172	35.662	614.05	1359.9	656.51	1546.6	1829.1	2176
14.7	69.477	86.577	621.65	1376.7	1234.1	1542.6	1830	2174.5
14.8	152.27	635.21	619.97	1361.9	1402.6	1519.2	1824.3	2175.7
14.9	572.09	637.23	622.74	1338.2	1400.4	1496.5	1821	2171.8

r = radial distance of HPDV measurement, from center of diagnostic plate = millimeters

v = vertical velocity of diagnostic plate at position r = meters/second

t = time from detonator circuit current start = microseconds

r →	0	10	20	25	30	35	40	50
t								
15	605.52	641.49	620.67	1318.7	1391.3	1481.6	1816.6	2171.7
15.1	633.71	639.41	621.2	1308.4	1372.9	1467.8	1809.9	2169.2
15.2	655.41	634.24	624.03	1285.9	1365.1	1450.1	1809.3	2168.8
15.3	669.02	633.46	628.84	1279.1	1349.9	1442.9	1808.8	2169.1
15.4	671.81	629.52	631.96	1276.2	1342.1	1433.8	1815.1	2168.9
15.5	674.36	624.87	639.46	1279.8	1341.4	1427.4	1808.9	2165.3
15.6	673.87	621.33	656.4	1275.2	1336.5	1422.4	1811.9	2164.5
15.7	675.44	624.28	665.75	1266.1	1339.2	1416.2	1808.4	2164.5
15.8	679.23	625.71	687.94	1272.7	1333.4	1415.7	1811.2	2164.6
15.9	679.64	629.34	706.98	1272.7	1332.3	1403.2	1808.2	2162.9
16	680.07	629.86	733.08	1274.1	1333.8	1403.5	1811	2162.8
16.1	681.12	637.37	1126.1	1276.2	1336.3	1402.3	1804.8	2162.6
16.2	682.13	652.81	1200.1	1270.1	1350.8	1400	1808.1	2162.2
16.3	698.76	670.27	1224.5	1268.7	1369.6	1398.6	1801.4	2161.3
16.4	735.06	692.46	1225.2	1272.8	1386	1405.5	1800	2160.7
16.5	779.7	717.99	1222.8	1279.5	1412.9	1413.7	1802.9	2160.5
16.6	805.67	745.08	1215.3	1288	1445.4	1426.1	1803.9	2159.4
16.7	818.81	804.1	1210.9	1304.3	1472.1	1455.2	1807	2158.8
16.8	837.23	891.12	1209.2	1316.9	1485.2	1473.7	1809.3	2158.9
16.9	877.26	894.52	1211.4	1332.6	1493.8	1490.5	1807.9	2158
17	897.62	897.06	1213	1348.3	1499	1497.1	1810.9	2158.4
17.1	912.76	902.06	1220.3	1360.1	1508.2	1505.1	1810.5	2157
17.2	925.61	908.9	1240.5	1375.3	1514.2	1511	1813.3	2156.4
17.3	928.91	912.59	1284.9	1384.9	1518.5	1511.5	1817.3	2156.2
17.4	923.77	915.47	1343.5	1393.5	1515.6	1524.9	1815.1	2155.4
17.5	921.38	917.8	1400.8	1406.9	1513.3	1533.6	1819.1	2154.6
17.6	923.76	921.19	1412.5	1414.5	1518.8	1544.3	1819.2	2154.4
17.7	926.42	923.6	1414.5	1429.8	1522.3	1556	1801.8	2154.1
17.8	928.89	927.87	1414.9	1450	1527	1567.6	1830	2152.6
17.9	933.44	933.93	1408.9	1462.7	1528.7	1575.4	1825.7	2153.1
18	941.95	943.25	1401.1	1466.5	1534.5	1582.8	1827.9	2152.2
18.1	947.41	970.18	1398.4	1470.2	1536.3	1584.2	1828.3	2151.4
18.2	957.04	1037.4	1397.6	1474.3	1537.2	1585.6	1832	2151.3
18.3	969.35	1057.9	1398.9	1475.2	1542.9	1577.5	1836.4	2150.2
18.4	1006.2	1070.8	1404.3	1480.2	1551	1593.4	1839.6	2150.7
18.5	1041.5	1085.4	1413.7	1487.7	1559.1	1597.5	1845.6	2149.9
18.6	1051.2	1109.2	1426.2	1491.1	1567.3	1607.4	1850.5	2148.3
18.7	1065.8	1131.7	1436.8	1496.1	1573	1613.9	1853	2148.2
18.8	1083.3	1163	1446	1505.1	1577.2	1625.3	1859.3	2147.7
18.9	1116.9	1228	1452.1	1511.9	1580.7	1634.2	1864	2146.9

r = radial distance of HPDV measurement, from center of diagnostic plate = millimeters

v = vertical velocity of diagnostic plate at position r = meters/second

t = time from detonator circuit current start = microseconds

r →	0	10	20	25	30	35	40	50
t								
19	1202.5	1270.4	1457.9	1519.2	1585.8	1637.8	1869.5	2147.1
19.1	1283.2	1327.9	1463.1	1527.5	1586.8	1643	1873.3	2147.9
19.2	1314.3	1372.9	1469.5	1538.6	1582.1	1643.6	1875.8	2146.8
19.3	1326.6	1404.5	1472.2	1544.5	1590.3	1644.6	1881.9	2146.7
19.4	1327.7	1464	1472.8	1546.4	1592.7	1649	1886.8	2146.4
19.5	1335.7	1482.5	1471.6	1545.9	1592.9	1652.6	1891.8	2146.1
19.6	1348	1478.1	1470.5	1547.6	1594.9	1653	1896.2	2145.7
19.7	1375.1	1472	1470.8	1550.3	1597.1	1652.3	1899.9	2145.5
19.8	1425.1	1473.9	1472.9	1550.7	1598.5	1652.1	1901	2145.5
19.9	1496.9	1482.3	1476.5	1545.8	1603.4	1652.1	1909	2145.2
20	1559.4	1505.1	1481.3	1543.7	1605.5	1655.7	1912.9	2145.5
20.1	1605.3	1546.1	1486.8	1544.4	1605.9	1657.3	1916	2145.1
20.2	1671.2	1584.1	1490.7	1544.9	1608.4	1659	1922.6	2144.6
20.3	1710.9	1611.5	1492.6	1548.5	1609.1	1659.7	1923.5	2144.5
20.4	1739.6	1636.2	1496.5	1552.4	1608.7	1660.6	1925.8	2143.4
20.5	1761.8	1657.3	1497.1	1555.8	1608.5	1661	1929.1	2142.1
20.6	1792	1685.9	1497.7	1557.5	1609.6	1665.1	1932.1	2141.9
20.7	1793.4	1712.9	1497.2	1559.8	1610.8	1669.4	1936.5	2141.3
20.8	1772.6	1751.2	1496.1	1565.9	1611.4	1669.3	1940.3	2141.9
20.9	1753.5	1774.5	1495.4	1566.4	1613	1672.7	1944.1	2140.8
21	1737.9	1753.9	1495.2	1567.7	1614	1674.6	1946.3	2138.8
21.1	1727.3	1735.1	1495.7	1570.2	1614.9	1678	1950.1	2138.5
21.2	1717.1	1716.3	1497.2	1573.5	1626.8	1679.5	1955.3	2138
21.3	1710.1	1702.6	1498.9	1578.8	1619	1682.3	1957.5	2137.2
21.4	1706.3	1691.2	1499.2	1580.2	1620.3	1684.5	1961.4	2135.7
21.5	1703	1681.5	1497.4	1580.8	1623.1	1689.1	1964.2	2134.8
21.6	1703	1672.2	1499.7	1583.8	1625.2	1691.6	1968.9	2133.7
21.7	1704.3	1667.6	1499.7	1584.4	1627.4	1691.5	1968.6	2133.8
21.8	1716.7	1665.6	1499.8	1588	1629	1692	1973	2131.9
21.9	1729.4	1673	1499.7	1587.8	1630.8	1692.4	1978.2	2133.9
22	1734.7	1678.7	1499.6	1592.2	1633.6	1692.1	1976.6	2131.4
22.1	1739.8	1683.4	1499.2	1597.9	1635.2	1692.3	1981.6	2129.8
22.2	1745	1686.2	1497.8	1595.5	1634.7	1696	1984.3	2132
22.3	1747.6	1690.1	1496.3	1595.8	1640.5	1700.6	1986.3	2131.4
22.4	1749.1	1696.9	1495.2	1598.8	1641.5	1700.1	1986.6	2130
22.5	1751.1	1704.3	1494.2	1601.8	1642	1700.6	1987.1	2128.9
22.6	1751.1	1710.7	1493.1	1603	1642.3	1702.9	1989.6	2128
22.7	1752.3	1717.8	1492.7	1604.4	1642.3	1704.6	1988.4	2128.6
22.8	1749.5	1722	1492.2	1600.8	1644.2	1706.8	1991	2127.4
22.9	1746.1	1725.6	1493.5	1593.9	1639.7	1707.6	1989.5	2127.7

r = radial distance of HPDV measurement, from center of diagnostic plate = millimeters

v = vertical velocity of diagnostic plate at position r = meters/second

t = time from detonator circuit current start = microseconds

r →	0	10	20	25	30	35	40	50
t								
23	1743.1	1726.1	1498.2	1606.2	1647.6	1708.7	1991	2127.1
23.1	1739	1722.2	1503.3	1618.5	1651.9	1711.3	1991.8	2126.4
23.2	1734.5	1716.4	1508.9	1618.6	1652.4	1711.6	1994.6	2125.7
23.3	1729.5	1711.3	1510.5	1622.3	1656.2	1714.4	1995.2	2125.2
23.4	1723.3	1704.6	1510.8	1626.3	1659.1	1715.5	1996.7	2125.8
23.5	1716.3	1697.4	1512.4	1628.9	1660.9	1718	1995.7	2124.1
23.6	1709.2	1691.4	1513.8	1629	1662.8	1715.8	1997	2125
23.7	1702.2	1686.7	1515.8	1632	1663.9	1719.6	1995.8	2124.6
23.8	1696.2	1681.3	1518.2	1633.4	1665.9	1718.9	2002.6	2123.9
23.9	1695.6	1676.8	1520.8	1639.8	1668.1	1724.9	1996.8	2123.8
24	1696.4	1673.8	1521.3	1641.2	1671.5	1720.3	1997.1	2123.7
24.1	1696.7	1673.5	1521.9	1641.9	1672.5	1719.5	1995.1	2123.5
24.2	1698	1674.4	1525.1	1646.9	1673.9	1719.2	2000.3	2122.4
24.3	1699.9	1678	1528.2	1650.7	1675.3	1719.1	1997.5	2121.9
24.4	1703.7	1680.3	1529.6	1654.2	1675.6	1718.8	1999.3	2121.6
24.5	1709	1683.4	1530	1662.1	1677.6	1720.2	2000	2121.3
24.6	1717.6	1685.9	1529.2	1659.4	1682.9	1822.9	2000.2	2121.3
24.7	1718	1690.2	1527.9	1661.1	1681.1	1823.5	2001.1	2119.7
24.8	1722.5	1691.5	1527.8	1665.2	1681.3	1825.4	2002	2118.3
24.9	1726.1	1694.9	1528.7	1664.2	1684.7	1826.3	2003.8	2117.8
25	1726.5	1695.3	1531.2	1670.2	1683.2	1830.5	2004.9	2116.9
25.1	1725.6	1696.1	1531.8	1670.1	1685.5	1829.2	2005.7	2117.5
25.2	1724.7	1695.8	1533.6	1670.4	1687.2	1832.2	2007.5	2115.4
25.3	1723.5	1696.2	1534.5	1669.7	1688.7	1833.7	2006.2	2116.7
25.4	1722	1693.3	1536.5	1671.5	1685.2	1833.8	2009.4	2115
25.5	1720.1	1692.5	1539.9	1673.2	1692.4	1836.6	2009.1	2117.2
25.6	1718.8	1691.3	1539.9	1677.3	1694.3	1836.2	2010	2115.2
25.7	1714.1	1689.1	1541.8	1680.4	1694.3	1836.8	2010.8	2114.8
25.8	1717.4	1687.6	1543	1684.3	1711.5	1840.3	2011.7	2114.7
25.9	1711.8	1685.7	1543.8	1688.6	1698.9	1839.9	2012.5	2114.1
26	1709.2	1682.8	1544.3	1690	1696.3	1841.5	2012.2	2114
26.1	1707.5	1679.9	1543.9	1692.9	1696.6	1843.7	2012.4	2113.5
26.2	1707.4	1677.8	1543.2	1697	1699.9	1844.1	2014.1	2112.9
26.3	1707.3	1676.9	1542	1695.7	1701.9	1847.5	2014	2114.6
26.4	1708.5	1677.6	1540.2	1697	1701	1845.1	2013.8	2113.8
26.5	1709.5	1677.2	1538.3	1699.5	1703.3	1846.1	2015.7	2114.9
26.6	1711.2	1677.9	1537.3	1700.4	1705.1	1850.4	2015.9	2113
26.7	1713.2	1676	1537	1699.8	1703.3	1857.2	2015.9	2111.9
26.8	1712.5	1675.9	1535.1	1700.3	1703.3	1851.9	2015.2	2111.9
26.9	1713.5	1675.9	1533.5	1701.8	1704.7	1851.6	2017.7	2112.1

r = radial distance of HPDV measurement, from center of diagnostic plate = millimeters

v = vertical velocity of diagnostic plate at position r = meters/second

t = time from detonator circuit current start = microseconds

r →	0	10	20	25	30	35	40	50
t								
27	1714.1	1676.2	1533.2	1702.1	1706.2	1854	2016.5	2111.4
27.1	1714.7	1675.3	1534	1702.9	1706.6	1853.5	2011.4	2111.1
27.2	1715.2	1673.5	1530.3	1704.4	1709.4	1858.9	2013.1	2111.2
27.3	1715.4	1676.2	1534.4	1703.9	1710.5	1858.1	2017.8	2110.8
27.4	1715.2	1675.5	1536.1	1706.4	1710.4	1856.3	2017.8	2110.5
27.5	1714.9	1675	1536.5	1708.6	1715.8	1859.8	2019.4	2110.2
27.6	1714.3	1675.2	1535.1	1711.3	1712.8	1857.2	2019	2109.8
27.7	1714.1	1675	1537.6	1714.3	1712.1	1855.8	2021.8	2109.1
27.8	1713	1673.8	1538.2	1716.1	1719.8	1853.4	2019.8	2108.6
27.9	1712.5	1672.7	1538	1715	1718.1	1857	2019.8	2107.7
28	1711.9	1672	1537.7	1716.3	1718.7	1858.9	2021.7	2107.6
28.1	1711.6	1672	1539.3	1718.2	1715.3	1858	2021.9	2107.2
28.2	1710.1	1671.3	1539.8	1718.7	1718.8	1859	2021.2	2106.1
28.3	1708.5	1669.8	1539.2	1722.3	1721.7	1859	2021.2	2105.5
28.4	1707	1667.8	1540.9	1720.5	1716.6	1859.3	2020.1	2105.2
28.5	1706.4	1664.9	1538.8	1721.4	1731.5	1862.9	2023.1	2104
28.6	1705.7	1660.4	1540.1	1729.8	1723.9	1864.7	2022.6	2103.6
28.7	1704.4	1661.9	1540.6	1727.5	1728.3	1863.8	2023.8	2103.1
28.8	1702.5	1659.4	1532.9	1728.8	1730.8	1862.7	2024.2	2102.5
28.9	1702.4	1658.8	1536.6	1744.5	1730.6	1864.3	2023.7	2102
29	1701.9	1657.7	1528.2	1731.4	1732.4	1863.2	2024.3	2100.7
29.1	1701.4	1658.9	1535.1	1726.2	1732	1868.2	2024.3	2100.5
29.2	1700.8	1655	1532.2	1732.9	1730.7	1866.6	2025.2	2099.3
29.3	1700.1	1654	1533.5	1734.3	1739.4	1869.2	2025.2	2098.8
29.4	1699.4	1652.2	1532.1	1735.7	1731.4	1868.8	2025.6	2098.4
29.5	1698.7	1652.4	1534.6	1733.5	1733.1	1868.7	2024.8	2096.8
29.6	1698.1	1652.1	1535.7	1735.7	1744.1	1868.4	2026.3	2097
29.7	1696.7	1651.8	1537.4	1736.1	1731.8	1869.1	2026.5	2096.8
29.8	1694.9	1652.1	1536.5	1738.3	1735.5	1869	2027.5	2096.4
29.9	1690.2	1652	1539.8	1739.6	1731.7	1871.9	2026	2095.8
30	1693	1652.1	1538.4	1741	1735.5	1869.8	2026.5	2094.7
30.1	1692	1651.2	1538.2	1743.2	1739.9	1870.4	2027.4	2094
30.2	1690.9	1650.9	1537.5	1744	1734.5	1872.1	2027.2	2093.9
30.3	1690.1	1650.4	1541.9	1740.1	1741.2	1873.4	2023.6	2092.5
30.4	1689.1	1649.7	1538.3	1744.1	1742	1873.6	2028	2091.3
30.5	1688.4	1648.3	1541.8	1736.7	1737	1874	2026.8	2091
30.6	1687.6	1648.6	1540.2	1744.9	1738.8	1874.4	2028.5	2090.4
30.7	1686.9	1647	1537.5	1749.7	1738.1	1877.2	2032.6	2089.1
30.8	1686.7	1645.2	1539.8	1749.9	1739.1	1874.6	2025.7	2088.2
30.9	1684.2	1643.5	1538.8	1750.7	1739.3	1876.2	2047.9	2086.8

r = radial distance of HPDV measurement, from center of diagnostic plate = millimeters

v = vertical velocity of diagnostic plate at position r = meters/second

t = time from detonator circuit current start = microseconds

r →	0	10	20	25	30	35	40	50
t								
31	1682.1	1643.5	1543.8	1751.2	1741.2	1877.9	2028.5	2086.4
31.1	1680.5	1642.3	1543.5	1749.5	1740.5	1877.3	2029	2085.6
31.2	1678	1640.9	1544	1752	1746.6	1877.3	2030.2	2086
31.3	1674.5	1639.8	1543.8	1754.2	1738.8	1877	2029.4	2086.5
31.4	1674.5	1639	1545.4	1755.1	1743.1	1879.2	2030.3	2084.4
31.5	1673.5	1637.7	1544.1	1753.2	1742.9	1880.4	2031.7	2083.6
31.6	1672	1635.9	1546.2	1756.3	1739.1	1878.9	2026.3	2083.8
31.7	1670.3	1635.2	1547.6	1754.8	1739.2	1877.2	2031.9	2082.8
31.8	1667.1	1632.9	1548.6	1756.7	1740.9	1880.3	2028	2082.1
31.9	1667.9	1632.1	1548.7	1760.1	1739.7	1886.5	2031.8	2081.8
32	1667	1634.8	1549.8	1759.8	1739.1	1881.7	2035.2	2081.4
32.1	1662.4	1632.6	1551.4	1760.8	1736.4	1880.9	2028.2	2080.6
32.2	1663	1632	1552.3	1763.2	1745.3	1882.3	2032.7	2080.4
32.3	1662.2	1631.3	1553.9	1760.5	1743.3	1885.7	2032.8	2079.8
32.4	1661.4	1630.7	1554.3	1756.7	1742.7	1886.3	2031.5	2079.4
32.5	1661.3	1636.7	1555.5	1763.4	1741	1887.2	2032.9	2079.4
32.6	1658.1	1629.7	1554.9	1766.1	1738.6	1888.5	2032.9	2081.3
32.7	1656.5	1630.8	1556.5	1764.1	1745.5	1889.1	2033.8	2074.4
32.8	1655	1630.6	1557	1760.9	1746.8	1891	2033.7	2076.8
32.9	1653.6	1629.5	1557.6	1767.8	1744.5	1892.4	2034.2	2077.1
33	1652.1	1627.7	1558.5	1769.8	1745.8	1894.4	2034.3	2075.9
33.1	1649.9	1627.8	1559.8	1770.5	1747	1893.3	2034.1	2076.1
33.2	1648.3	1627.1	1559.5	1774.5	1749.6	1895.2	2034.4	2073.9
33.3	1646.5	1625	1560.3	1770.9	1747.7	1898.4	2034.6	2073.9
33.4	1644.1	1616.5	1559.6	1772.1	1749.8	1898.8	2035.3	2073.1
33.5	1642.8	1621.7	1559.1	1775.9	1748.2	1898.7	2035.8	2072.9
33.6	1640.8	1619.6	1558.9	1773.9	1745.8	1900.4	2036.1	2072.3
33.7	1639.6	1618.5	1559.8	1773.8	1747.2	1899.6	2036	2072.7
33.8	1637	1617.5	1558.7	1766.4	1747.8	1900.5	2036.6	2071.5
33.9	1635.5	1617.2	1560.6	1776.3	1749.9	1900.6	2036.6	2071.5
34	1634.5	1617.1	1560	1773.7	1751.5	1901.7	2037.1	2070.4
34.1	1632.4	1616.5	1560	1768.6	1749.8	1901.6	2037.1	2070.3
34.2	1629.5	1615.2	1565.8	1776.8	1747.7	1901.1	2036.9	2069.8
34.3	1629.4	1613.7	1563	1776.5	1747.8	1902.6	2038	2069.1
34.4	1628.1	1614.6	1563.6	1778.3	1748.6	1902	2037.3	2068.2
34.5	1627.3	1611.1	1563.2	1780.1	1747.1	1901.4	2037.8	2067.5
34.6	1626.3	1611.9	1563.1	1778	1747.2	1902.5	2037.7	2067.3
34.7	1625.6	1611.3	1563.4	1779.2	1742.7	1902	2037.7	2068.5
34.8	1624.5	1611	1563.6	1783.8	1740.9	1899.8	2037.3	2065.5
34.9	1623.6	1610.1	1563.5	1779	1747.6	1902.1	2036.8	2065.2

r = radial distance of HPDV measurement, from center of diagnostic plate = millimeters

v = vertical velocity of diagnostic plate at position r = meters/second

t = time from detonator circuit current start = microseconds

r →	0	10	20	25	30	35	40	50
t								
35	1622.2	1610.5	1565.3	1783.3	1747.8	1903.5	2036.1	2064.7
35.1	1620.9	1609.4	1565.7	1780	1747.8	1902.4	2037.6	2063.8
35.2	1619.1	1608.1	1565.8	1782.4	1749.6	1906.5	2037.4	2063.1
35.3	1617.5	1607.6	1566.8	1783.1	1747.5	1905.6	2036.6	2062.9
35.4	1616.1	1606.2	1566.6	1782.9	1746.3	1907	2035.8	2062.4
35.5	1613.9	1604.3	1568.4	1784.2	1746.3	1905.7	2035	2062
35.6	1613.8	1603.9	1568.9	1783.7	1740.7	1908.1	2035.8	2060.1
35.7	1608.1	1602	1569.3	1783.3	1745.5	1910.3	2034.5	2061.7
35.8	1607.3	1602.4	1567.1	1788.2	1745	1910.9	2035.9	2062.2
35.9	1608.8	1600.2	1569.5	1790.6	1746	1904.5	2034.9	2059.8
36	1606.7	1600	1570.3	1792.3	1746.8	1909.6	2034.1	2060.3
36.1	1604.6	1598	1570.4	1788.1	1746.4	1913.5	2034.1	2060
36.2	1602.8	1595.8	1571.1	1789.6	1742.4	1913.6	2033.6	2058.6
36.3	1600.9	1595.6	1571.7	1789.1	1740.8	1913.8	2033.8	2060.9
36.4	1599.2	1597.7	1572.7	1787.4	1742.8	1913.4	2033.3	2059.2
36.5	1598.1	1595.7	1573.8	1791.1	1743	1914	2033	2058.1
36.6	1597.7	1592.6	1574.2	1793.2	1742.2	1920	2032.7	2057.8
36.7	1597	1591.6	1572.9	1791	1743.3	1921.2	2032.9	2055.1
36.8	1595.4	1590.7	1575.4	1792.3	1741.1	1905.4	2032.5	2053
36.9	1594.2	1590.2	1575.9	1793.1	1741.5	1924.9	2030.3	2059
37	1593	1589.7	1576.2	1793.3	1742.7	1924.4	2031.5	2057.7
37.1	1587.9	1586.4	1576.6	1792.6	1743.5	1925.2	2030.5	2056.5
37.2	1592.3	1586.6	1576.3	1792.9	1742.9	1921.9	2031.9	2056.2
37.3	1589.4	1586.6	1579.2	1794.5	1742.3	1920.9	2030.8	2054.9
37.4	1587.7	1587.6	1578.4	1794.6	1740.5	1921.2	2036.7	2055.5
37.5	1585.6	1583.5	1582.4	1794.3	1740.7	1923.4	2030.5	2055.4
37.6	1585.1	1584.8	1581.2	1795.5	1732.5	1923.5	2030.1	2054.8
37.7	1584.1	1580.8	1581.5	1796.4	1739.2	1925.3	2028.9	2054.4
37.8	1582	1579.9	1581.4	1795	1737.6	1923.6	2029.6	2053.3
37.9	1580.4	1579	1581.7	1795.4	1735.1	1922.8	2029.1	2053
38	1579.7	1577.9	1582.7	1800.6	1740	1928.8	2030.7	2053.7
38.1	1577.4	1577	1583.3	1796.9	1743.2	1925.7	2024.5	2053.3
38.2	1576.2	1572.9	1582.4	1793.2	1739.4	1928.3	2030.1	2053.2
38.3	1574.3	1574.6	1583.1	1797	1737.3	1925.6	2028.1	2052.3
38.4	1572.6	1571.8	1583.3	1797.5	1736.5	1927.6	2027.5	2052.5
38.5	1570.1	1571.6	1583.9	1800.3	1736.3	1925.4	2028.5	2052
38.6	1568.5	1569.4	1585.6	1796.9	1736.4	1928.7	2027.6	2051.5
38.7	1568	1568.9	1582.4	1799.7	1736.4	1928.7	2027.7	2050.6
38.8	1566.5	1567.4	1585.7	1798.6	1734.9	1925.8	2028.8	2050.1
38.9	1564.3	1566.5	1584.7	1799	1734.3	1926.5	2027.2	2037.6

r = radial distance of HPDV measurement, from center of diagnostic plate = millimeters

v = vertical velocity of diagnostic plate at position r = meters/second

t = time from detonator circuit current start = microseconds

r →	0	10	20	25	30	35	40	50
t								
39	1564.4	1567.3	1586.2	1802.2	1734	1932.7	2027.2	2050.4
39.1	1563.2	1563.5	1586.5	1801.6	1734.9	1935.9	2029	2049.5
39.2	1562	1575.5	1588.3	1802.2	1734	1934.6	2027	2050.1
39.3	1560.9	1565.8	1588.1	1803.2	1732.2	1937.4	2030.1	2049.3
39.4	1558.9	1564.1	1589.6	1798.2	1730.8	1934.5	2027.2	2048.3
39.5	1557.5	1562.4	1587.3	1805.9	1732.3	1930.8	2027.5	2048.7
39.6	1555.9	1562.8	1591.2	1804.5	1731.3	1930.9	2025.5	2047.4
39.7	1556.3	1561.1	1589.7	1805.7	1728.4	1931.8	2029.3	2047.5
39.8	1553.4	1559.6	1591.3	1805.5	1729.1	1931.6	2026.9	2046.1
39.9	1551.7	1559	1592	1806	1728	1930.5	2026.3	2046.4
40	1550.1	1558.3	1592.4	1805.4	1727.4	1929.8	2024.4	2047
40.1	1548.3	1556.2	1592.2	1806.4	1726.5	1929.5	2027.5	2046.3
40.2	1547.2	1553.8	1591.9	1805.8	1726.6	1931	2027.3	2044.1
40.3	1545.9	1552.1	1592.9	1804.7	1725.1	1932.7	2025.5	2045.2
40.4	1546.8	1551.7	1594.1	1806.7	1726.1	1932.1	2018.3	2046.3
40.5	1544	1551.1	1593.8	1807.1	1722.7	1930	2028	2045
40.6	1540.1	1550	1595.2	1810.7	1721.6	1931	2026.3	2045.1
40.7	1539.5	1548.3	1595.5	1809.9	1723	1932.2	2026.6	2044.3
40.8	1537.6	1547.1	1596.2	1808	1722.4	1931.9	2028.2	2044
40.9	1536.3	1546.2	1597.3	1809.1	1721.6	1932.3	2027.8	2041.3
41	1533.3	1544.8	1596.2	1807.9	1720.8	1930.3	2026.3	2042.3
41.1	1534.4	1544.5	1597.2	1808.5	1719.8	1932.4	2029.6	2041.6
41.2	1530.9	1543.1	1598.6	1813.2	1720.9	1933.7	2028.1	2044.1
41.3	1532.1	1543.4	1598	1811	1720.2	1932.3	2026.7	2042.7
41.4	1532.2	1541.5	1598.9	1811.3	1719.5	1930	2027.2	2042.8
41.5	1533.1	1542.9	1601.5	1811.9	1721.7	1932.6	2028	2040.8
41.6	1533	1538.7	1601.8	1809.4	1718.5	1933.1	2026.6	2041
41.7	1531.7	1543.2	1601	1812	1718.2	1932.5	2025.8	2038.3
41.8	1528.5	1544.1	1601	1810.9	1717.9	1930.9	2026	2041
41.9	1531.3	1540.1	1603	1813.9	1717.4	1933.1	2024.8	2040.1
42	1529	1542.1	1605.6	1803.8	1717.7	1932.9	2026.8	2039.7
42.1	1528.1	1539.5	1605.4	1811.6	1718.5	1931.3	2026.8	2037.9
42.2	1527.6	1540.6	1605	1812.7	1717.1	1932.2	2026.5	2037.4
42.3	1530.4	1542.7	1606.3	1811.6	1716.7	1932.9	2033.4	2038.3
42.4	1528.4	1538.5	1607.8	1815.4	1715.4	1931.9	2030.5	2037.7
42.5	1526.2	1538.7	1608.2	1812.2	1716.2	1932.9	2025.8	2039.3
42.6	1527.1	1536.3	1609.6	1813.2	1714.9	1934.4	2028.8	2038.6
42.7	1526.1	1535.1	1613.5	1815	1714.2	1932.8	2025.4	2043.6
42.8	1526.5	1534	1611.1	1813.5	1713.8	1928.2	2018.8	2038.3
42.9	1525.1	1533.8	1611.1	1812.4	1711.7	1936	2031.7	2036.8

r = radial distance of HPDV measurement, from center of diagnostic plate = millimeters

v = vertical velocity of diagnostic plate at position r = meters/second

t = time from detonator circuit current start = microseconds

r →	0	10	20	25	30	35	40	50
t								
43	1523.7	1533.7	1610.8	1813	1713.4	1934.1	2028.5	2036.4
43.1	1524.1	1533.2	1611.5	1813	1712.5	1934.4	2025.7	2035.5
43.2	1523.2	1532.9	1612.9	1820.6	1710.4	1935.4	2031.8	2034.8
43.3	1524	1532.9	1612.9	1811.2	1710.8	1932.2	2024.1	2036
43.4	1523.8	1531.2	1614.5	1816.7	1713.6	1934.1	2029.5	2035.4
43.5	1523.6	1531	1615.8	1823.4	1711.1	1932.2	2027.6	2035.8
43.6	1522.7	1531	1614.7	1816.9	1714.8	1934.8	2025.7	2037.9
43.7	1523	1530.4	1617.9	1817	1715	1934.3	2028.7	2035.7
43.8	1522.3	1531.9	1617.6	1817.6	1708.9	1935	2027.5	2033.4
43.9	1522	1530.6	1618	1817.4	1714.8	1932.8	2029.5	2033.9
44	1522.7	1532	1617.8	1818.4	1705.7	1933.7	2030.9	2033.8
44.1	1522.2	1531.4	1619.6	1818	1707.4	1934.3	2029.9	2034.2
44.2	1523.5	1529.2	1621.1	1818.2	1696.3	1933	2026.6	2034.3
44.3	1525.3	1530.9	1621.5	1817.9	1708.3	1936.2	2025.9	2034.2
44.4	1524.3	1530.5	1622.1	1818	1707.7	1943.4	2027.6	2034.8
44.5	1522.6	1529.9	1622.4	1817.5	1708.7	1939.2	2024.5	2031.3
44.6	1521.9	1529.2	1636.3	1818.2	1709.1	1933.4	2026.8	2032.1
44.7	1522.5	1530.6	1624.5	1818.5	1708.4	1935.3	2031.1	2030.9
44.8	1521.6	1529.3	1629.1	1817.3	1707	1934	2019	2030.2
44.9	1522	1529.3	1625.7	1818		1937.2	2027.9	2029.2
45	1521.7	1527.2	1626.8	1816.6		1936.7	2026.6	2029.8
45.1	1521.8	1529.2	1626.6	1816.3		1935.8	2024.1	2023.8
45.2	1521.4	1528.6	1626.7	1817.6		1933.1	2027.7	2028.7
45.3	1521.2	1528.8	1629.5	1815.5		1933.4	2026.5	2026.7
45.4	1520.5	1528.4	1628.3	1815.6		1936.2	2032.5	2027.2
45.5	1521.6	1528.4	1629.8	1816.9		1933.2	2028.6	2027.1
45.6	1520.4	1527.8	1628.6	1818.9		1937	2031.1	2027.2
45.7	1518.2	1529.6	1630.6	1819.1		1936.9	2030.6	2029.2
45.8	1521.6	1526.5	1630.8	1815		1935.4	2025	2027.7
45.9	1533.5	1528.1	1633	1819.3		1934.9	2027.9	2025.5
46	1520.5	1529	1634.1	1819.6		1936.4	2026	2024.4
46.1	1519.8	1529.1	1633.9	1821.9		1937.7	2027.5	2023.4
46.2	1520.3	1528.6	1635.2	1822.2		1937.1	2027.3	2024.8
46.3	1519.5	1529.3	1636.2	1819.1		1935.9	2029.2	2024.7
46.4	1517	1530	1636.9	1820.2		1935.7	2031.5	2023
46.5	1516.1	1529.8	1638.2	1828.4		1936.3	2029.2	2023.3
46.6	1514	1528.4	1635.9	1813.1		1936.1	2028.6	2024.6
46.7	1519.3	1527.3	1639.7	1820.7		1936.6	2019.5	2022.9
46.8	1518.2	1515.4	1641.7	1820.5		1936	2024.4	2024.3
46.9	1517.7	1526.4	1640.9	1828.2		1937.2	2025	2025

r = radial distance of HPDV measurement, from center of diagnostic plate = millimeters

v = vertical velocity of diagnostic plate at position r = meters/second

t = time from detonator circuit current start = microseconds

r →	0	10	20	25	30	35	40	50
t								
47	1516.4	1526.7	1642.1	1820.4		1937.8	2029.1	2024.7
47.1	1517.3	1527.1	1640.6	1820.7		1936.5	2027.5	2023.7
47.2	1516.6	1524.6	1643.3	1821.8		1938	2029.9	2023.1
47.3	1517.7	1527.1	1641.8	1823		1937.6	2029	2021.9
47.4	1518.8	1526.7	1643.9	1823.6		1937.9	2027.4	2022.4
47.5	1517.6	1527.6	1644.8	1821.1		1935.4	2027.2	2021.8
47.6	1516.9	1525.7	1645.6	1822		1941.1	2024.9	2022.2
47.7	1513.1	1525	1646.3	1823		1939	2026.8	2021.8
47.8	1505.9	1520.7	1644.8	1825.2		1935.9	2028.3	2021
47.9	1504.6	1523.4	1648.4	1821.8		1939.9	2028.3	2021.4
48	1520.1	1521.8	1647.5	1820.9		1939	2023.2	2020.4
48.1	1505.9	1522.6	1649.8	1820.2		1940.6	2030.3	2020.4
48.2	1507.3	1524.8	1641.6	1824.9		1939.8	2024.9	2020.8
48.3	1515.8	1524.9	1649	1827.9		1939.4	2028.2	2021.2
48.4	1517.4	1524.8	1649.3	1823.4		1940.2	2025.8	2021.8
48.5	1518.5	1526.2	1647.9	1820.1		1939.9	2022	2021.7
48.6	1519.3	1526	1651.6	1827.2		1938.7	2019	2022.5
48.7	1520.4	1526.1	1652.8	1822.6		1939.7	2027.2	2021.2
48.8	1521.1	1523.4	1654.4	1823.8		1942.2	2027.6	2021.2
48.9	1527.6	1525.4	1652.2	1825.6		1939.8	2029.7	2022
49	1519.8	1524.5	1649.6	1827.2		1939.5	2026.3	2020.6
49.1	1520.6	1522.7	1654.6	1824.5		1940	2026.5	2020.8
49.2	1518.5	1522.5	1655.9	1823.8		1939.4	2025.3	2014.3
49.3	1519.1	1524.8	1655.8	1826.1		1938.9	2026.7	2019.3
49.4	1519.4	1522.5	1658.7	1825.7		1939.1	2027	2019.8
49.5	1518.8	1522.2	1655.3	1825.8		1941.5	2030.3	2019.1
49.6	1518.7	1521.1	1656.2	1823		1939.3	2026.3	2028.4
49.7	1518.6	1512.7	1658	1824.1		1939.6	2021.4	2021
49.8	1517.7	1519	1657.8	1821		1941.1	2022.9	2020.2
49.9	1517.1	1522	1655.5	1824.4		1942.1	2023.9	2020.8
50	1517.3	1520.5	1657.8	1826.2		1938.8	2025.8	2020.3
50.1	1517.1	1521.2	1658.8	1824.8		1945.4	2028.7	2022.6
50.2	1516.2	1521	1659.2	1828.2		1939.4	2026.5	2024
50.3	1516.5	1527.4	1658.2	1826.6		1935.2	2026.8	2021.7
50.4	1516.8	1522.2	1655.6	1830.2		1940	2026.5	2021.9
50.5	1517.4	1523.7	1660.5	1827.7		1935.7	2025.1	2016.5
50.6	1517.7	1527.3	1663.5	1828.3		1938.4	2023.5	2021.8
50.7	1516.2	1528.2	1662.5	1827.6		1940.4	2026.3	2021.2
50.8	1515.6	1527.1	1661.8	1825.1		1944.1	2025.9	2021.4
50.9	1513.2	1528.5	1661.8	1826.8		1942.2	2026.8	2021

r = radial distance of HPDV measurement, from center of diagnostic plate = millimeters

v = vertical velocity of diagnostic plate at position r = meters/second

t = time from detonator circuit current start = microseconds

r →	0	10	20	25	30	35	40	50
t								
51	1515.5	1528.2	1670.2	1827.9		1944.1	2027.1	2018.8
51.1	1516.1	1528.5	1658.6	1826.2		1942.9	2026.7	2021.5
51.2	1515.3	1527.3	1661.4	1827.7		1942.1	2026.8	2021.3
51.3	1514.5	1528.4	1662.8	1827.8		1945.5	2026.1	2021
51.4	1515.8	1533.3	1661.9	1826.8		1943.9	2027.1	2021.2
51.5	1511.4	1532.2	1663.7	1827.4		1942.4	2025.8	2021.5
51.6	1516	1533	1660.5	1827		1942.1	2026.1	2020.8
51.7	1517.8	1535.4	1663	1846.3		1938.3	2025.1	2021.1
51.8	1515.1	1532.4	1667.7	1824.6		1937.5	2024.6	2021.6
51.9	1515.2	1534.1	1666.3	1835.1		1938.8	2026.3	2020.5
52	1514.6	1534.3	1664.6	1824.3		1939	2025.3	2021
52.1	1514.1	1533.8	1664.9	1821.4		1939	2025.5	2022.3
52.2	1515.7	1534.3	1667.2	1828.5		1934.6	2028.8	2019.5
52.3	1514.6	1531.7	1664.9	1825.7		1941.1	2025.5	2021.1
52.4	1515	1533	1670	1829		1941.2	2026.3	2022.1
52.5	1515.2	1531.4	1666.7	1827.4		1937.8	2026.5	2022.1
52.6	1514.8	1531.1	1666	1827.6		1943.6	2025.5	2021.5
52.7	1514	1532	1665	1829.4		1944.2	2024.7	2021.3
52.8	1510.9	1531.6	1661.2	1827.9		1944.1	2024.1	2021.6
52.9	1514.6	1532	1669.6	1829.4		1947.4	2026	2027.6
53	1514.2	1533.2	1664.6	1829.3		1949.7	2026.1	2022.1
53.1	1513.6	1530.5	1668	1829		1946.6	2023.4	2021.4
53.2	1513.5	1527	1668.9	1825.3		1946.6	2024.7	2020.2
53.3	1513.2	1532.7	1671.5	1828.4		1945.5	2026.2	2021.8
53.4	1508.4	1533.6	1668.7	1828.2		1951	2026.4	2021.4
53.5	1514.8	1534.6	1669.6	1829.3		1935.5	2026	2020.5
53.6	1514.2	1534.8	1666.6	1825.5		1939.7	2026.6	2021.1
53.7	1513.7	1536.4	1671.6	1828.5		1948.4	2019.5	2021.4
53.8	1514.2	1535.9	1671.2	1830		1944.6	2029.1	2021.4
53.9	1515	1534.9	1671	1831.1		1946.9	2026.6	2021.3
54	1515.4	1535.3	1670.7	1829.8		1951	2026.5	2020.1
54.1	1517.7	1535.3	1668.2	1821.2		1947.5	2025.2	2022.1
54.2	1516.8	1535	1668.8	1836		1947.4	2020.7	2021
54.3	1514.1	1533.8	1670.7	1822.3		1950.2	2026.8	2020.9
54.4	1513.5	1532.7	1671.8	1830.7		1949	2027.4	2021.6
54.5	1515.1	1535	1674.5	1826.8		1948	2028	2020.8
54.6	1514.9	1535	1666.7	1835.6		1951.5	2028.6	2018
54.7	1514.6	1532.6	1674.4	1829.7		1944.3	2042.4	2020.5
54.8	1514.1	1534.7	1671.9	1832.4		1944.9	2029.1	2021.4
54.9	1515.1	1536.5	1671.1	1832.2		1945.4	2026	2020.7

r = radial distance of HPDV measurement, from center of diagnostic plate = millimeters

v = vertical velocity of diagnostic plate at position r = meters/second

t = time from detonator circuit current start = microseconds

r →	0	10	20	25	30	35	40	50
t								
55	1516.2	1537.1	1672.2	1830.6		1946	2022.4	2020.5
55.1	1516	1535.6	1671.2	1834.6		1952.6	2023.2	2019.2
55.2	1515.5	1535.8	1671.9	1833.3		1946.4	2026.5	2018.1
55.3	1515.2	1537.1	1684.7	1833		1947.8	2026.7	2019.8
55.4	1520.1	1538.3	1669.8	1834.8		1950.8	2021.8	2020.3
55.5	1514.2	1537.7	1681.1	1834.7		1942.5	2026.2	2019.8
55.6	1516	1537.2	1672.8	1836.1		1946.3	2025.8	2018.8
55.7	1515.9	1537.3	1672.5	1834.1		1941.7	2027.3	2019.6
55.8	1516	1538	1674.4	1833.4		1947	2023.7	2020.4
55.9	1516	1538.7	1673	1831.5		1948.5	2026.6	2019.2
56	1515.9	1538.2	1676.8	1835.8		1956.1	2023.7	2020
56.1	1516.5	1540.4	1674.7	1845.1		1947.8	2031.2	2018.1
56.2	1517	1539.1	1673.1	1833.3		1946.8	2022.7	2019.2
56.3	1517.9	1537.9	1671.2	1828.6		1947	2024	2020.3
56.4	1516.2	1538.9	1676.2	1842.7		1954.5	2025.7	2019.5
56.5	1517	1539	1675.5	1838.8		1950.2	2021	2014.3
56.6	1517.8	1540.1	1673.6	1831		1948.6	2025.2	2018.3
56.7	1517.1	1542.2	1675.1	1829.4		1949.9	2025.3	2016
56.8	1518.5	1541.4	1673.6	1839.8		1952.7	2027.9	2018
56.9	1517.6	1541.8	1671.4	1837		1955.2	2024.8	2016.6
57	1518.5	1543.5	1672.4	1831		1951.1	2026.6	2018.2
57.1	1520.9	1541.6	1678.3	1836.1		1950.3	2025.8	2016.6
57.2	1519.3	1540.7	1674.1	1833		1947.7	2026.9	2018
57.3	1518.6	1541.9	1673.7	1832.3		1949.1	2026.3	2018
57.4	1519	1542.3	1676.9	1834.9		1949.3	2025.9	2018.6
57.5	1519.1	1543.3	1678.2	1832.9		1948.8	2026.6	2018.9
57.6	1531.5	1544.2	1677.7	1833.1		1946.6	2028.1	2018.8
57.7	1520.1	1544.3	1676.2	1829.3		1951.6	2025.1	2018.2
57.8	1519.1	1547.6	1673.8	1833.1		1949.9	2032.2	2016.6
57.9	1518.5	1545.3	1674.9	1834.2		1941.7	2028	2017.9
58	1520.1	1545.9	1673.7	1832		1944.5	2027.2	2018.4
58.1	1523.5	1549.3	1674.9			1950.1	2029.7	2015.5
58.2	1519.2	1549.2	1675.1			1948.2	2026.9	2017.8
58.3	1520.5	1546.9	1681.5			1947.8	2025.2	2017.6
58.4	1524.6	1546.6	1676.6			1947.5	2025.4	2013.6
58.5	1521.4	1546.3	1673.5			1950.9	2025.5	2016.4
58.6	1520.1	1545.9	1674.4			1948.6	2036.6	2013.7
58.7	1521.1	1543.5	1674			1948.3	2037.5	2016.3
58.8	1522.1	1544.7	1679.4			1936.9	2024.7	2016.8
58.9	1521.8	1544.6	1676.6			1938.2	2022.8	2017.2

r = radial distance of HPDV measurement, from center of diagnostic plate = millimeters

v = vertical velocity of diagnostic plate at position r = meters/second

t = time from detonator circuit current start = microseconds

r →	0	10	20	25	30	35	40	50
t								
59	1523	1546.5	1678			1941.3	2020.8	2016.9
59.1	1523.5	1546.6	1677.8			1935.2	2013.5	2011.7
59.2	1522.2	1545.9	1676.4			1940.1	2021.5	2015.9
59.3	1522.1	1548	1678.6			1942.9	2022.4	2014.7
59.4	1523.6	1547.5				1947.1	2020.2	2018.8
59.5	1525.7	1548.4				1951.7	2020.1	2018.3
59.6	1523.2	1549				1950.9	2020.8	2017.1
59.7	1525.4	1556.5				1950.5	2025.8	2024.5
59.8	1522.3	1549.2				1946.1	2025.8	2016.3
59.9	1524.4	1550.9				1951.9	2021.5	2017
60	1525.2	1552				1940	2020	2018.7
60.1	1527.9	1551.5				1949.5	2019.1	2013.8
60.2	1525.6	1551.6				1950.6	2015.8	2019.1
60.3	1524.3	1551.9				1934.7	2022.2	2013.2
60.4	1523.8	1553.5				1954	2021.9	2015.4
60.5	1523.5	1554.3				1944.7	2026.4	2015.3
60.6	1525.3	1555.3				1956.3	2018.4	2012.3
60.7	1524.7	1553.9				1941.9	2022.7	2016.8
60.8	1525.4	1553.7				1941.6	2024.3	2014.4
60.9	1524.1	1555.6				1943.2	2030.6	2012.2
61	1524	1555.7				1935.5	2021.1	2011.3
61.1	1526.1	1555.3					2016.5	2009.3
61.2	1527.3	1558.6					2008.5	2007.6
61.3	1528.4	1561.4					2027.2	2004.3
61.4	1528.4	1558.6					2013.8	2012.3
61.5	1530	1561.3					2014.7	2007.3
61.6	1529.9	1553.8					2021.6	2008.3
61.7	1533.2	1554.9					2010.8	2014.8
61.8	1529	1557.2					2009.2	1994.4
61.9	1528.9	1570.2					2011.3	2016.2
62	1531.3	1561.9					2014	2007.3
62.1	1533.2	1566.2					2017.1	2004.6
62.2	1524.4	1559.6					2000.2	2005.6
62.3	1533.8	1555.2					2005.5	
62.4	1532.4	1566.3					1994.4	
62.5	1524.3	1558.5					2017.9	
62.6	1527.9	1555.6					2010.8	
62.7	1528.2	1555.4					2007.6	
62.8	1528.1	1544.5					2020.6	
62.9	1514.7	1555.8					2018.9	

r = radial distance of HPDV measurement, from center of diagnostic plate = millimeters

v = vertical velocity of diagnostic plate at position r = meters/second

t = time from detonator circuit current start = microseconds

r →	0	10	20	25	30	35	40	50
t								
63	1527.6	1546.3						
63.1	1517.5	1546.7						
63.2	1521.8	1546.1						
63.3	1523.3	1548.4						
63.4	1532.7	1555.4						
63.5	1532.1	1557.5						
63.6	1532.6	1560.9						
63.7	1529.7	1555						
63.8	1528.5	1560.5						
63.9	1532.1	1557.4						
64	1538.8	1553.3						
64.1	1535.1	1551						
64.2	1535.8	1546						
64.3	1534	1550						
64.4	1539.8	1555.5						
64.5	1542.1	1556.5						
64.6	1543.3	1562.7						
64.7	1530.9	1564.1						
64.8	1542.9	1547						
64.9	1544	1570.4						
65	1551	1566.1						
65.1	1545.7	1558.7						
65.2	1546.7	1562.9						
65.3	1548.3	1568.3						
65.4	1541	1572.9						
65.5	1538.7	1561.9						
65.6	1539.6	1558.2						
65.7	1538.4	1557.6						
65.8	1540	1567.5						
65.9	1539.6	1556.5						
66	1536.8	1558.1						
66.1	1539	1557.4						
66.2	1533.2	1566.7						
66.3	1546.9	1569.4						
66.4	1544	1565.7						
66.5	1554.7	1571.4						
66.6	1545.2	1566.1						
66.7	1551.6	1564.6						
66.8	1550	1569.2						
66.9	1549.4	1578.3						

r = radial distance of HPDV measurement, from center of diagnostic plate = millimeters

v = vertical velocity of diagnostic plate at position r = meters/second

t = time from detonator circuit current start = microseconds

r →	0	10	20	25	30	35	40	50
t								
67	1552.1	1580.9						
67.1	1557.5	1579.7						
67.2	1553.7	1573.4						
67.3	1550.5	1572.8						
67.4	1559.6	1578.2						
67.5	1559.6	1575.5						
67.6	1558.8	1577.7						
67.7	1559.6	1581.9						
67.8	1553.5	1585.4						
67.9	1565.8	1580.1						
68	1560.3	1571.6						
68.1	1572.5	1570.2						
68.2	1566	1574						
68.3	1563.3	1579.8						
68.4	1570.8	1570.1						
68.5	1568.2	1567.3						
68.6	1565	1569.8						
68.7	1558.1	1563						
68.8		1570.6						
68.9		1562.7						
69		1556.1						
69.1		1569						
69.2		1592.7						
69.4		1558.4						

r = radial distance of HPDV measurement, from center of diagnostic plate = millimeters

v = vertical velocity of diagnostic plate at position r = meters/second

t = time from detonator circuit current start = microseconds

DIAGNOSTIC PLATE DISPLACEMENT TABLE

Table 4. Tabulated Diagnostic Plate Displacement of Jack Rabbit Pretest 2021E PT4; time is referenced from detonator circuit current start

Jack Rabbit Pretest 2021E PT4 POSITION Data								
Columnar data: z = mm from top of diagnostic plate datum								
absolute timing accuracy relative to time zero = +/- 0.025 microseconds								
relative timing uncertainty between data channels = +/- 0.005 microseconds								
z position uncertainty = +/- 5 percent of measurement								
PDV measurement point position uncertainty = +/- 0.25 millimeters								
r →	0	10	20	25	30	35	40	50
t								
12	0	0	0	0	0	0	0	0
12.1	0	0	0	0	0	0	0	0
12.2	0	0	0	0	0	0	0	0
12.3	0	0	0	0	0	0	0	0
12.4	0	0	0	0	0	0	0	0
12.5	0	0	0	0	0	0	0	0
12.6	5E-05	0	0	0	0	0	0	0
12.7	0.0002	0	0	0	0	0	0	0
12.8	0.0003	0	0	0	0	0	0	0
12.9	0.0005	0	0	0	0	0	0	0
13	0.0007	0	0	0	0	0	0	0
13.1	0.001	0	0	0	0	0	0	0
13.2	0.0013	0	0	0	0	0	0	0
13.3	0.0016	7E-05	0	0	0	0	0	0.1197
13.4	0.002	0.0002	0	0	0	0	0	0.3544
13.5	0.0024	0.0004	0	0	0	0	0	0.5809
13.6	0.0027	0.0006	0	0	0	0	0	0.8038
13.7	0.0031	0.0008	0	0	0	0	0	1.0256
13.8	0.0035	0.001	0	0	0	0	0	1.2461
13.9	0.0039	0.0012	0	0	0	0	0.0576	1.4659
14	0.0043	0.0015	0	0	0	0	0.213	1.6854
14.1	0.0047	0.0017	0	0.0027	0.0025	0	0.4051	1.9043
14.2	0.0051	0.002	0.0023	0.0114	0.0162	0	0.5924	2.1231
14.3	0.0055	0.0022	0.0195	0.0469	0.0577	0.0032	0.7783	2.3414
14.4	0.0059	0.0025	0.0649	0.107	0.1193	0.0396	0.9637	2.5592
14.5	0.0063	0.0029	0.1262	0.1693	0.1826	0.1068	1.1483	2.7773
14.6	0.0069	0.0048	0.1878	0.269	0.2476	0.2182	1.3318	2.9952
14.7	0.0108	0.011	0.2495	0.4058	0.3421	0.3726	1.5147	3.2127
14.8	0.0219	0.047	0.3116	0.5428	0.4739	0.5257	1.6975	3.4303
14.9	0.0581	0.1107	0.3738	0.6778	0.6141	0.6765	1.8797	3.6476

r = radial distance of HPDV measurement, from center of diagnostic plate = millimeters

z = vertical distance from top surface datum of diagnostic plate = millimeters

t = time from detonator circuit current start = microseconds

r →	0	10	20	25	30	35	40	50
t								
15	0.117	0.1746	0.4359	0.8106	0.7537	0.8254	2.0616	3.8648
15.1	0.1789	0.2386	0.498	0.942	0.8919	0.9729	2.2429	4.0819
15.2	0.2434	0.3023	0.5603	1.0717	1.0288	1.1188	2.4239	4.2988
15.3	0.3096	0.3657	0.6229	1.1999	1.1645	1.2634	2.6048	4.5157
15.4	0.3766	0.4289	0.686	1.3277	1.2991	1.4073	2.786	4.7326
15.5	0.4439	0.4916	0.7495	1.4555	1.4333	1.5503	2.9672	4.9493
15.6	0.5114	0.5539	0.8143	1.5833	1.5672	1.6928	3.1482	5.1658
15.7	0.5788	0.6162	0.8804	1.7103	1.701	1.8348	3.3292	5.3822
15.8	0.6466	0.6787	0.9481	1.8373	1.8346	1.9763	3.5102	5.5987
15.9	0.7145	0.7414	1.0179	1.9645	1.9679	2.1173	3.6912	5.815
16	0.7825	0.8044	1.0899	2.0919	2.1012	2.2576	3.8722	6.0313
16.1	0.8505	0.8677	1.1828	2.2194	2.2347	2.3979	4.053	6.2476
16.2	0.9187	0.9323	1.2992	2.3467	2.3691	2.538	4.2336	6.4638
16.3	0.9878	0.9984	1.4204	2.4736	2.5051	2.678	4.4141	6.68
16.4	1.0594	1.0665	1.5429	2.6007	2.6429	2.8182	4.5942	6.8961
16.5	1.1352	1.1371	1.6653	2.7283	2.7828	2.9591	4.7743	7.1122
16.6	1.2145	1.2102	1.7872	2.8567	2.9257	3.1011	4.9546	7.3282
16.7	1.2957	1.2877	1.9085	2.9863	3.0716	3.2452	5.1352	7.5441
16.8	1.3785	1.3724	2.0295	3.1174	3.2195	3.3916	5.316	7.76
16.9	1.4642	1.4617	2.1505	3.2498	3.3684	3.5398	5.4969	7.9758
17	1.5529	1.5513	2.2717	3.3839	3.518	3.6892	5.6778	8.1916
17.1	1.6435	1.6413	2.3934	3.5193	3.6684	3.8393	5.8589	8.4074
17.2	1.7354	1.7318	2.5164	3.6561	3.8195	3.9901	6.0401	8.6231
17.3	1.8281	1.8229	2.6427	3.7941	3.9712	4.1413	6.2216	8.8387
17.4	1.9207	1.9143	2.7741	3.933	4.1229	4.2931	6.4032	9.0543
17.5	2.013	2.0059	2.9114	4.073	4.2743	4.446	6.5849	9.2698
17.6	2.1053	2.0979	3.052	4.2141	4.4259	4.5999	6.7669	9.4852
17.7	2.1978	2.1901	3.1934	4.3563	4.578	4.7549	6.9479	9.7006
17.8	2.2905	2.2827	3.3348	4.5003	4.7304	4.9111	7.1295	9.916
17.9	2.3836	2.3758	3.476	4.646	4.8832	5.0682	7.3123	10.131
18	2.4774	2.4697	3.6165	4.7924	5.0364	5.2262	7.495	10.347
18.1	2.5719	2.5653	3.7565	4.9392	5.1899	5.3845	7.6778	10.562
18.2	2.6671	2.6657	3.8963	5.0865	5.3436	5.543	7.8608	10.777
18.3	2.7634	2.7705	4.0361	5.2339	5.4976	5.7011	8.0442	10.992
18.4	2.8622	2.8769	4.1763	5.3817	5.6523	5.8597	8.228	11.207
18.5	2.9646	2.9847	4.3172	5.5301	5.8078	6.0192	8.4123	11.422
18.6	3.0692	3.0944	4.4592	5.6791	5.9641	6.1795	8.5971	11.637
18.7	3.1751	3.2065	4.6023	5.8284	6.1211	6.3406	8.7822	11.852
18.8	3.2825	3.3212	4.7465	5.9785	6.2786	6.5025	8.9679	12.067
18.9	3.3925	3.4408	4.8914	6.1293	6.4365	6.6655	9.154	12.281

r = radial distance of HPDV measurement, from center of diagnostic plate = millimeters

z = vertical distance from top surface datum of diagnostic plate = millimeters

t = time from detonator circuit current start = microseconds

r →	0	10	20	25	30	35	40	50
t								
19	3.5085	3.5657	5.0369	6.2809	6.5948	6.8291	9.3407	12.496
19.1	3.6328	3.6956	5.1829	6.4332	6.7535	6.9931	9.5278	12.711
19.2	3.7627	3.8306	5.3295	6.5865	6.9119	7.1575	9.7153	12.925
19.3	3.8947	3.9695	5.4766	6.7407	7.0705	7.3219	9.9032	13.14
19.4	4.0274	4.1129	5.6239	6.8952	7.2297	7.4865	10.092	13.355
19.5	4.1606	4.2603	5.7711	7.0498	7.389	7.6516	10.281	13.569
19.6	4.2948	4.4083	5.9182	7.2045	7.5484	7.8169	10.47	13.784
19.7	4.4309	4.5558	6.0653	7.3594	7.708	7.9822	10.66	13.999
19.8	4.5709	4.7031	6.2125	7.5144	7.8677	8.1474	10.85	14.213
19.9	4.717	4.8509	6.3599	7.6693	8.0278	8.3126	11.04	14.428
20	4.8699	5.0003	6.5078	7.8237	8.1883	8.478	11.231	14.642
20.1	5.0281	5.1528	6.6562	7.9782	8.3488	8.6436	11.423	14.857
20.2	5.1919	5.3093	6.8051	8.1326	8.5096	8.8095	11.615	15.071
20.3	5.361	5.4691	6.9543	8.2873	8.6704	8.9754	11.807	15.286
20.4	5.5336	5.6315	7.1037	8.4423	8.8313	9.1414	12	15.5
20.5	5.7086	5.7962	7.2534	8.5977	8.9922	9.3075	12.192	15.714
20.6	5.8863	5.9633	7.4031	8.7534	9.1531	9.4738	12.385	15.928
20.7	6.0656	6.1333	7.5529	8.9093	9.3141	9.6405	12.579	16.143
20.8	6.2439	6.3065	7.7025	9.0655	9.4752	9.8075	12.773	16.357
20.9	6.4202	6.4828	7.8521	9.2222	9.6364	9.9746	12.967	16.571
21	6.5948	6.6592	8.0016	9.3789	9.7978	10.142	13.161	16.785
21.1	6.768	6.8336	8.1512	9.5358	9.9592	10.31	13.356	16.999
21.2	6.9402	7.0062	8.3008	9.6929	10.121	10.477	13.551	17.213
21.3	7.1116	7.1772	8.4506	9.8506	10.284	10.646	13.747	17.426
21.4	7.2824	7.3468	8.6006	10.009	10.446	10.814	13.943	17.64
21.5	7.4529	7.5155	8.7504	10.167	10.608	10.983	14.139	17.854
21.6	7.6232	7.6832	8.9002	10.325	10.77	11.152	14.336	18.067
21.7	7.7936	7.8501	9.0502	10.483	10.933	11.321	14.533	18.28
21.8	7.9646	8.0168	9.2002	10.642	11.096	11.49	14.73	18.494
21.9	8.1369	8.1837	9.3502	10.801	11.259	11.659	14.927	18.707
22	8.3101	8.3513	9.5001	10.96	11.422	11.828	15.125	18.92
22.1	8.4838	8.5194	9.6501	11.119	11.585	11.998	15.323	19.133
22.2	8.6581	8.6879	9.7999	11.279	11.749	12.167	15.521	19.346
22.3	8.8327	8.8567	9.9496	11.438	11.913	12.337	15.72	19.56
22.4	9.0075	9.0261	10.099	11.598	12.077	12.507	15.919	19.773
22.5	9.1826	9.1961	10.249	11.758	12.241	12.677	16.117	19.986
22.6	9.3577	9.3669	10.398	11.918	12.405	12.847	16.316	20.198
22.7	9.5328	9.5383	10.547	12.079	12.569	13.017	16.515	20.411
22.8	9.7079	9.7103	10.697	12.239	12.734	13.188	16.714	20.624
22.9	9.8827	9.8827	10.846	12.399	12.898	13.359	16.913	20.837

r = radial distance of HPDV measurement, from center of diagnostic plate = millimeters

z = vertical distance from top surface datum of diagnostic plate = millimeters

t = time from detonator circuit current start = microseconds

r →	0	10	20	25	30	35	40	50
t								
23	10.057	10.055	10.995	12.559	13.062	13.53	17.112	21.049
23.1	10.231	10.228	11.146	12.72	13.227	13.701	17.311	21.262
23.2	10.405	10.4	11.296	12.882	13.392	13.872	17.51	21.475
23.3	10.578	10.571	11.447	13.044	13.558	14.043	17.71	21.687
23.4	10.751	10.742	11.598	13.206	13.724	14.214	17.91	21.9
23.5	10.923	10.912	11.749	13.369	13.89	14.386	18.109	22.112
23.6	11.094	11.081	11.901	13.532	14.056	14.558	18.309	22.325
23.7	11.265	11.25	12.052	13.695	14.222	14.73	18.508	22.537
23.8	11.435	11.419	12.204	13.858	14.389	14.902	18.708	22.75
23.9	11.604	11.587	12.356	14.022	14.555	15.074	18.908	22.962
24	11.774	11.754	12.508	14.186	14.722	15.246	19.108	23.174
24.1	11.943	11.921	12.66	14.35	14.889	15.418	19.308	23.387
24.2	12.113	12.089	12.812	14.515	15.057	15.59	19.507	23.599
24.3	12.283	12.256	12.965	14.679	15.224	15.762	19.707	23.811
24.4	12.453	12.424	13.118	14.845	15.392	15.934	19.907	24.024
24.5	12.624	12.593	13.271	15.011	15.559	16.106	20.107	24.236
24.6	12.795	12.761	13.424	15.177	15.727	16.283	20.307	24.448
24.7	12.967	12.93	13.577	15.343	15.896	16.465	20.507	24.66
24.8	13.139	13.099	13.73	15.509	16.064	16.648	20.707	24.872
24.9	13.311	13.268	13.882	15.675	16.232	16.83	20.908	25.084
25	13.484	13.438	14.035	15.842	16.4	17.013	21.108	25.295
25.1	13.657	13.607	14.188	16.009	16.569	17.196	21.309	25.507
25.2	13.829	13.777	14.342	16.176	16.738	17.379	21.509	25.719
25.3	14.002	13.946	14.495	16.343	16.906	17.562	21.71	25.93
25.4	14.174	14.116	14.649	16.51	17.075	17.746	21.911	26.142
25.5	14.346	14.285	14.803	16.677	17.244	17.929	22.112	26.353
25.6	14.518	14.454	14.957	16.845	17.413	18.113	22.313	26.565
25.7	14.69	14.623	15.111	17.013	17.583	18.297	22.514	26.777
25.8	14.861	14.792	15.265	17.181	17.753	18.48	22.715	26.988
25.9	15.033	14.961	15.419	17.35	17.923	18.664	22.916	27.2
26	15.204	15.129	15.574	17.519	18.093	18.848	23.117	27.411
26.1	15.374	15.298	15.728	17.688	18.263	19.033	23.318	27.622
26.2	15.545	15.465	15.882	17.857	18.433	19.217	23.52	27.834
26.3	15.716	15.633	16.037	18.027	18.603	19.402	23.721	28.045
26.4	15.887	15.801	16.191	18.197	18.773	19.586	23.923	28.256
26.5	16.058	15.969	16.345	18.366	18.943	19.771	24.124	28.468
26.6	16.229	16.136	16.498	18.536	19.114	19.956	24.326	28.679
26.7	16.4	16.304	16.652	18.706	19.284	20.141	24.527	28.89
26.8	16.571	16.472	16.806	18.876	19.454	20.327	24.729	29.102
26.9	16.742	16.639	16.959	19.047	19.625	20.512	24.93	29.313

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r →	0	10	20	25	30	35	40	50
t								
27	16.914	16.807	17.113	19.217	19.795	20.697	25.132	29.524
27.1	17.085	16.974	17.266	19.387	19.966	20.882	25.333	29.735
27.2	17.257	17.142	17.419	19.557	20.137	21.068	25.535	29.946
27.3	17.428	17.309	17.572	19.728	20.308	21.254	25.736	30.157
27.4	17.6	17.477	17.726	19.898	20.479	21.44	25.938	30.368
27.5	17.771	17.644	17.879	20.069	20.65	21.625	26.14	30.579
27.6	17.943	17.812	18.033	20.24	20.821	21.811	26.342	30.79
27.7	18.114	17.979	18.187	20.411	20.993	21.997	26.544	31.001
27.8	18.286	18.147	18.34	20.583	21.164	22.182	26.746	31.212
27.9	18.457	18.314	18.494	20.754	21.336	22.368	26.948	31.423
28	18.628	18.481	18.648	20.926	21.508	22.554	27.15	31.634
28.1	18.799	18.649	18.802	21.098	21.68	22.739	27.352	31.845
28.2	18.97	18.816	18.956	21.27	21.851	22.925	27.554	32.055
28.3	19.141	18.983	19.11	21.442	22.023	23.111	27.756	32.266
28.4	19.312	19.15	19.264	21.614	22.195	23.297	27.959	32.476
28.5	19.483	19.316	19.418	21.786	22.368	23.483	28.161	32.687
28.6	19.653	19.483	19.572	21.958	22.541	23.67	28.363	32.897
28.7	19.824	19.649	19.726	22.131	22.713	23.856	28.565	33.108
28.8	19.994	19.815	19.879	22.304	22.886	24.042	28.768	33.318
28.9	20.164	19.981	20.033	22.478	23.059	24.229	28.97	33.528
29	20.335	20.147	20.186	22.652	23.232	24.415	29.172	33.738
29.1	20.505	20.312	20.339	22.824	23.406	24.602	29.375	33.948
29.2	20.675	20.478	20.493	22.997	23.579	24.788	29.577	34.158
29.3	20.845	20.644	20.646	23.171	23.752	24.975	29.78	34.368
29.4	21.015	20.809	20.799	23.344	23.926	25.162	29.982	34.578
29.5	21.185	20.974	20.953	23.518	24.099	25.349	30.185	34.788
29.6	21.355	21.139	21.106	23.691	24.273	25.536	30.388	34.997
29.7	21.524	21.305	21.26	23.865	24.447	25.723	30.59	35.207
29.8	21.694	21.47	21.413	24.038	24.62	25.91	30.793	35.417
29.9	21.863	21.635	21.567	24.212	24.793	26.097	30.996	35.626
30	22.032	21.8	21.721	24.386	24.967	26.284	31.198	35.836
30.1	22.202	21.965	21.875	24.561	25.141	26.471	31.401	36.045
30.2	22.371	22.13	22.029	24.735	25.314	26.658	31.604	36.255
30.3	22.54	22.295	22.183	24.909	25.488	26.845	31.806	36.464
30.4	22.709	22.46	22.337	25.083	25.662	27.033	32.009	36.673
30.5	22.878	22.625	22.491	25.257	25.836	27.22	32.211	36.882
30.6	23.046	22.79	22.645	25.431	26.01	27.407	32.414	37.091
30.7	23.215	22.955	22.799	25.606	26.184	27.595	32.617	37.3
30.8	23.384	23.12	22.953	25.781	26.358	27.782	32.82	37.509
30.9	23.552	23.284	23.107	25.956	26.532	27.97	33.024	37.718

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r →	0	10	20	25	30	35	40	50
t								
31	23.721	23.448	23.261	26.131	26.706	28.158	33.228	37.927
31.1	23.889	23.613	23.415	26.306	26.88	28.345	33.431	38.135
31.2	24.057	23.777	23.569	26.481	27.054	28.533	33.634	38.344
31.3	24.224	23.941	23.724	26.657	27.228	28.721	33.837	38.553
31.4	24.392	24.105	23.878	26.832	27.402	28.909	34.039	38.761
31.5	24.559	24.269	24.033	27.008	27.577	29.097	34.243	38.969
31.6	24.727	24.432	24.187	27.183	27.751	29.285	34.445	39.178
31.7	24.894	24.596	24.342	27.359	27.925	29.472	34.648	39.386
31.8	25.061	24.759	24.497	27.534	28.099	29.66	34.851	39.594
31.9	25.227	24.923	24.652	27.71	28.273	29.849	35.054	39.803
32	25.394	25.086	24.807	27.886	28.447	30.037	35.258	40.011
32.1	25.561	25.249	24.962	28.062	28.62	30.225	35.461	40.219
32.2	25.727	25.413	25.117	28.238	28.794	30.413	35.664	40.427
32.3	25.893	25.576	25.272	28.414	28.969	30.602	35.867	40.635
32.4	26.059	25.739	25.428	28.59	29.143	30.79	36.07	40.843
32.5	26.225	25.902	25.583	28.766	29.317	30.979	36.274	41.051
32.6	26.391	26.065	25.739	28.943	29.491	31.168	36.477	41.259
32.7	26.557	26.228	25.894	29.119	29.666	31.357	36.68	41.467
32.8	26.723	26.392	26.05	29.296	29.84	31.546	36.884	41.674
32.9	26.888	26.555	26.206	29.472	30.015	31.735	37.087	41.882
33	27.053	26.717	26.361	29.649	30.189	31.924	37.29	42.09
33.1	27.218	26.88	26.517	29.826	30.364	32.114	37.494	42.297
33.2	27.383	27.043	26.673	30.003	30.539	32.303	37.697	42.505
33.3	27.548	27.206	26.829	30.18	30.714	32.493	37.901	42.712
33.4	27.713	27.368	26.985	30.358	30.889	32.683	38.104	42.919
33.5	27.877	27.53	27.141	30.535	31.063	32.872	38.308	43.127
33.6	28.041	27.692	27.297	30.712	31.238	33.062	38.511	43.334
33.7	28.205	27.853	27.453	30.89	31.413	33.252	38.715	43.541
33.8	28.369	28.015	27.609	31.067	31.588	33.442	38.919	43.748
33.9	28.533	28.177	27.765	31.244	31.762	33.633	39.122	43.956
34	28.696	28.339	27.921	31.421	31.937	33.823	39.326	44.163
34.1	28.859	28.5	28.077	31.599	32.113	34.013	39.53	44.37
34.2	29.023	28.662	28.233	31.776	32.287	34.203	39.733	44.577
34.3	29.186	28.823	28.39	31.954	32.462	34.393	39.937	44.784
34.4	29.348	28.985	28.546	32.131	32.637	34.583	40.141	44.991
34.5	29.511	29.146	28.702	32.309	32.812	34.774	40.345	45.197
34.6	29.674	29.307	28.859	32.487	32.986	34.964	40.548	45.404
34.7	29.836	29.468	29.015	32.665	33.161	35.154	40.752	45.611
34.8	29.999	29.63	29.171	32.843	33.335	35.344	40.956	45.818
34.9	30.161	29.791	29.328	33.021	33.51	35.534	41.16	46.024

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r →	0	10	20	25	30	35	40	50
t								
35	30.324	29.952	29.484	33.199	33.684	35.724	41.363	46.231
35.1	30.486	30.113	29.641	33.378	33.859	35.915	41.567	46.437
35.2	30.648	30.273	29.797	33.556	34.034	36.105	41.771	46.643
35.3	30.81	30.434	29.954	33.734	34.209	36.296	41.974	46.85
35.4	30.971	30.595	30.11	33.912	34.384	36.486	42.178	47.056
35.5	31.133	30.755	30.267	34.091	34.558	36.677	42.382	47.262
35.6	31.294	30.916	30.424	34.269	34.733	36.868	42.585	47.468
35.7	31.455	31.076	30.581	34.447	34.907	37.059	42.789	47.674
35.8	31.616	31.236	30.738	34.626	35.081	37.25	42.992	47.88
35.9	31.777	31.397	30.895	34.805	35.256	37.44	43.196	48.087
36	31.938	31.557	31.052	34.984	35.431	37.631	43.399	48.293
36.1	32.098	31.716	31.209	35.163	35.605	37.822	43.603	48.499
36.2	32.259	31.876	31.366	35.342	35.78	38.014	43.806	48.705
36.3	32.419	32.036	31.523	35.521	35.954	38.205	44.009	48.911
36.4	32.579	32.195	31.68	35.7	36.128	38.396	44.213	49.117
36.5	32.739	32.355	31.837	35.879	36.302	38.588	44.416	49.322
36.6	32.898	32.514	31.995	36.058	36.477	38.779	44.619	49.528
36.7	33.058	32.674	32.152	36.237	36.651	38.972	44.823	49.734
36.8	33.218	32.833	32.31	36.416	36.825	39.163	45.026	49.939
36.9	33.377	32.992	32.467	36.595	36.999	39.354	45.229	50.145
37	33.537	33.151	32.625	36.775	37.173	39.547	45.432	50.351
37.1	33.696	33.31	32.782	36.954	37.348	39.739	45.635	50.556
37.2	33.855	33.468	32.94	37.133	37.522	39.932	45.838	50.762
37.3	34.014	33.627	33.098	37.313	37.696	40.124	46.041	50.968
37.4	34.173	33.786	33.256	37.492	37.87	40.316	46.245	51.173
37.5	34.331	33.944	33.414	37.672	38.044	40.508	46.448	51.379
37.6	34.49	34.103	33.572	37.851	38.218	40.7	46.651	51.584
37.7	34.648	34.261	33.73	38.031	38.392	40.893	46.854	51.79
37.8	34.807	34.419	33.888	38.21	38.566	41.085	47.057	51.995
37.9	34.965	34.577	34.046	38.39	38.739	41.278	47.26	52.2
38	35.123	34.735	34.205	38.57	38.913	41.47	47.463	52.406
38.1	35.281	34.892	34.363	38.749	39.087	41.663	47.666	52.611
38.2	35.438	35.05	34.521	38.929	39.261	41.856	47.868	52.816
38.3	35.596	35.207	34.679	39.108	39.435	42.048	48.071	53.022
38.4	35.753	35.365	34.838	39.288	39.609	42.241	48.274	53.227
38.5	35.91	35.522	34.996	39.468	39.782	42.434	48.477	53.432
38.6	36.067	35.679	35.155	39.648	39.956	42.626	48.68	53.637
38.7	36.224	35.836	35.313	39.828	40.13	42.819	48.883	53.842
38.8	36.381	35.993	35.471	40.008	40.303	43.012	49.085	54.047
38.9	36.537	36.149	35.63	40.188	40.477	43.205	49.288	54.252

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r →	0	10	20	25	30	35	40	50
t								
39	36.694	36.306	35.788	40.368	40.65	43.398	49.491	54.456
39.1	36.85	36.463	35.947	40.548	40.824	43.591	49.694	54.661
39.2	37.006	36.619	36.106	40.728	40.997	43.785	49.896	54.866
39.3	37.162	36.777	36.265	40.908	41.17	43.978	50.099	55.071
39.4	37.318	36.933	36.424	41.088	41.343	44.172	50.302	55.276
39.5	37.474	37.089	36.582	41.269	41.517	44.365	50.505	55.481
39.6	37.63	37.246	36.741	41.449	41.69	44.558	50.708	55.686
39.7	37.786	37.402	36.9	41.63	41.863	44.751	50.91	55.89
39.8	37.941	37.558	37.059	41.81	42.036	44.944	51.113	56.095
39.9	38.096	37.714	37.219	41.991	42.208	45.138	51.316	56.3
40	38.251	37.87	37.378	42.171	42.381	45.331	51.518	56.504
40.1	38.406	38.025	37.537	42.352	42.554	45.523	51.721	56.709
40.2	38.561	38.181	37.696	42.532	42.727	45.717	51.924	56.914
40.3	38.716	38.336	37.855	42.713	42.899	45.91	52.126	57.118
40.4	38.87	38.491	38.015	42.894	43.072	46.103	52.329	57.323
40.5	39.025	38.646	38.174	43.074	43.244	46.296	52.531	57.527
40.6	39.179	38.802	38.334	43.255	43.416	46.489	52.734	57.732
40.7	39.333	38.956	38.493	43.436	43.589	46.682	52.936	57.936
40.8	39.487	39.111	38.653	43.617	43.761	46.875	53.139	58.14
40.9	39.641	39.266	38.812	43.798	43.933	47.069	53.342	58.345
41	39.794	39.42	38.972	43.979	44.105	47.262	53.544	58.549
41.1	39.948	39.575	39.132	44.16	44.277	47.455	53.747	58.753
41.2	40.101	39.729	39.292	44.341	44.449	47.648	53.95	58.957
41.3	40.254	39.884	39.451	44.522	44.621	47.842	54.153	59.162
41.4	40.407	40.038	39.611	44.703	44.793	48.035	54.356	59.366
41.5	40.56	40.192	39.771	44.884	44.965	48.228	54.558	59.57
41.6	40.714	40.346	39.931	45.065	45.137	48.421	54.761	59.774
41.7	40.867	40.5	40.092	45.246	45.309	48.614	54.964	59.978
41.8	41.02	40.655	40.252	45.427	45.481	48.808	55.166	60.182
41.9	41.173	40.809	40.412	45.609	45.653	49.001	55.369	60.386
42	41.326	40.963	40.572	45.79	45.825	49.194	55.571	60.59
42.1	41.479	41.117	40.733	45.97	45.996	49.387	55.774	60.794
42.2	41.632	41.271	40.893	46.152	46.168	49.58	55.977	60.998
42.3	41.785	41.425	41.054	46.333	46.34	49.774	56.18	61.202
42.4	41.937	41.579	41.215	46.514	46.511	49.967	56.383	61.406
42.5	42.09	41.733	41.375	46.695	46.683	50.16	56.586	61.609
42.6	42.243	41.887	41.536	46.877	46.855	50.353	56.788	61.813
42.7	42.396	42.04	41.698	47.058	47.026	50.547	56.991	62.017
42.8	42.548	42.194	41.859	47.24	47.197	50.74	57.193	62.221
42.9	42.701	42.347	42.02	47.421	47.369	50.933	57.396	62.425

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r →	0	10	20	25	30	35	40	50
t								
43	42.853	42.501	42.181	47.602	47.54	51.127	57.599	62.629
43.1	43.006	42.654	42.342	47.783	47.711	51.32	57.802	62.832
43.2	43.158	42.807	42.503	47.965	47.882	51.514	58.004	63.036
43.3	43.31	42.961	42.665	48.147	48.053	51.707	58.207	63.24
43.4	43.463	43.114	42.826	48.328	48.225	51.9	58.41	63.443
43.5	43.615	43.267	42.987	48.51	48.396	52.094	58.613	63.647
43.6	43.767	43.42	43.149	48.692	48.567	52.287	58.815	63.85
43.7	43.92	43.573	43.311	48.874	48.739	52.48	59.018	64.054
43.8	44.072	43.726	43.472	49.056	48.91	52.674	59.221	64.257
43.9	44.224	43.879	43.634	49.237	49.081	52.867	59.424	64.461
44	44.376	44.032	43.796	49.419	49.252	53.061	59.627	64.664
44.1	44.529	44.186	43.958	49.601	49.423	53.254	59.83	64.868
44.2	44.681	44.339	44.12	49.783	49.593	53.447	60.033	65.071
44.3	44.833	44.492	44.282	49.965	49.763	53.641	60.235	65.274
44.4	44.986	44.645	44.444	50.146	49.934	53.835	60.438	65.478
44.5	45.138	44.798	44.606	50.328	50.105	54.029	60.641	65.681
44.6	45.29	44.951	44.769	50.51	50.276	54.222	60.843	65.884
44.7	45.443	45.104	44.932	50.692	50.447	54.416	61.046	66.088
44.8	45.595	45.257	45.095	50.874	50.617	54.609	61.249	66.291
44.9	45.747	45.41	45.258	51.055		54.803	61.451	66.494
45	45.899	45.562	45.42	51.237		54.997	61.654	66.697
45.1	46.051	45.715	45.583	51.419		55.19	61.856	66.899
45.2	46.204	45.868	45.746	51.6		55.384	62.059	67.102
45.3	46.356	46.021	45.909	51.782		55.577	62.261	67.305
45.4	46.508	46.174	46.071	51.964		55.771	62.464	67.507
45.5	46.66	46.327	46.234	52.145		55.964	62.667	67.71
45.6	46.812	46.48	46.397	52.327		56.157	62.87	67.913
45.7	46.964	46.632	46.56	52.509		56.351	63.074	68.116
45.8	47.116	46.785	46.723	52.691		56.545	63.276	68.318
45.9	47.269	46.938	46.887	52.872		56.738	63.479	68.521
46	47.421	47.091	47.05	53.054		56.932	63.682	68.724
46.1	47.573	47.244	47.213	53.236		57.126	63.884	68.926
46.2	47.725	47.397	47.377	53.419		57.319	64.087	69.128
46.3	47.877	47.549	47.54	53.601		57.513	64.29	69.331
46.4	48.029	47.702	47.704	53.783		57.707	64.493	69.533
46.5	48.181	47.855	47.868	53.965		57.9	64.696	69.736
46.6	48.332	48.008	48.031	54.147		58.094	64.899	69.938
46.7	48.484	48.161	48.195	54.329		58.287	65.101	70.14
46.8	48.636	48.313	48.359	54.511		58.481	65.303	70.343
46.9	48.788	48.465	48.523	54.693		58.675	65.506	70.545

r = radial distance of HPDV measurement, from center of diagnostic plate = millimeters

z = vertical distance from top surface datum of diagnostic plate = millimeters

t = time from detonator circuit current start = microseconds

r →	0	10	20	25	30	35	40	50
t								
47	48.939	48.618	48.688	54.876		58.868	65.709	70.748
47.1	49.091	48.771	48.852	55.058		59.062	65.911	70.95
47.2	49.243	48.923	49.016	55.24		59.256	66.114	71.152
47.3	49.394	49.076	49.18	55.422		59.45	66.317	71.355
47.4	49.546	49.229	49.344	55.604		59.643	66.52	71.557
47.5	49.698	49.381	49.509	55.787		59.837	66.723	71.759
47.6	49.85	49.534	49.673	55.969		60.031	66.925	71.961
47.7	50.001	49.686	49.838	56.151		60.225	67.128	72.163
47.8	50.152	49.839	50.003	56.333		60.419	67.331	72.366
47.9	50.303	49.991	50.167	56.516		60.612	67.534	72.568
48	50.454	50.143	50.332	56.698		60.806	67.736	72.77
48.1	50.605	50.295	50.497	56.88		61	67.939	72.972
48.2	50.756	50.448	50.661	57.062		61.194	68.142	73.174
48.3	50.907	50.6	50.826	57.245		61.388	68.344	73.376
48.4	51.059	50.753	50.991	57.427		61.582	68.547	73.578
48.5	51.211	50.905	51.156	57.61		61.776	68.749	73.78
48.6	51.362	51.058	51.321	57.792		61.97	68.951	73.983
48.7	51.514	51.21	51.486	57.975		62.164	69.154	74.185
48.8	51.667	51.363	51.651	58.157		62.358	69.356	74.387
48.9	51.819	51.515	51.817	58.339		62.552	69.559	74.589
49	51.971	51.668	51.982	58.522		62.746	69.762	74.791
49.1	52.123	51.82	52.147	58.705		62.94	69.965	74.993
49.2	52.275	51.973	52.312	58.887		63.134	70.167	75.195
49.3	52.427	52.125	52.478	59.069		63.328	70.37	75.397
49.4	52.579	52.277	52.644	59.252		63.522	70.573	75.599
49.5	52.731	52.429	52.809	59.435		63.716	70.776	75.801
49.6	52.883	52.582	52.975	59.617		63.91	70.978	76.003
49.7	53.035	52.733	53.141	59.799		64.104	71.181	76.205
49.8	53.187	52.885	53.307	59.982		64.298	71.383	76.407
49.9	53.338	53.037	53.472	60.164		64.492	71.585	76.609
50	53.49	53.189	53.638	60.346		64.686	71.788	76.812
50.1	53.642	53.341	53.804	60.529		64.881	71.99	77.014
50.2	53.793	53.493	53.97	60.712		65.075	72.193	77.216
50.3	53.945	53.646	54.135	60.894		65.269	72.396	77.418
50.4	54.097	53.798	54.301	61.077		65.462	72.599	77.62
50.5	54.248	53.95	54.467	61.26		65.656	72.801	77.822
50.6	54.4	54.103	54.633	61.443		65.85	73.004	78.024
50.7	54.552	54.256	54.799	61.626		66.044	73.206	78.226
50.8	54.703	54.409	54.966	61.808		66.238	73.409	78.429
50.9	54.855	54.561	55.132	61.991		66.432	73.611	78.631

r = radial distance of HPDV measurement, from center of diagnostic plate = millimeters

z = vertical distance from top surface datum of diagnostic plate = millimeters

t = time from detonator circuit current start = microseconds

r →	0	10	20	25	30	35	40	50
t								
51	55.006	54.714	55.298	62.174		66.627	73.814	78.833
51.1	55.158	54.867	55.465	62.356		66.821	74.017	79.035
51.2	55.31	55.02	55.631	62.539		67.015	74.219	79.237
51.3	55.461	55.173	55.797	62.722		67.21	74.422	79.439
51.4	55.613	55.326	55.963	62.905		67.404	74.625	79.641
51.5	55.764	55.479	56.13	63.087		67.598	74.827	79.843
51.6	55.915	55.632	56.296	63.27		67.793	75.03	80.045
51.7	56.067	55.786	56.462	63.454		67.987	75.233	80.247
51.8	56.219	55.939	56.629	63.637		68.18	75.435	80.45
51.9	56.37	56.092	56.795	63.82		68.374	75.638	80.652
52	56.522	56.246	56.962	64.003		68.568	75.84	80.854
52.1	56.673	56.399	57.128	64.185		68.762	76.043	81.056
52.2	56.825	56.553	57.295	64.368		68.956	76.245	81.258
52.3	56.976	56.706	57.461	64.551		69.149	76.448	81.46
52.4	57.128	56.859	57.628	64.733		69.344	76.651	81.662
52.5	57.279	57.012	57.795	64.916		69.538	76.853	81.864
52.6	57.431	57.165	57.962	65.099		69.732	77.056	82.067
52.7	57.582	57.319	58.128	65.282		69.926	77.258	82.269
52.8	57.733	57.472	58.295	65.465		70.12	77.461	82.471
52.9	57.884	57.625	58.461	65.648		70.315	77.663	82.673
53	58.036	57.778	58.628	65.83		70.51	77.866	82.876
53.1	58.187	57.931	58.794	66.013		70.705	78.068	83.078
53.2	58.339	58.084	58.961	66.196		70.899	78.271	83.28
53.3	58.49	58.237	59.128	66.379		71.094	78.473	83.482
53.4	58.641	58.391	59.295	66.562		71.289	78.676	83.684
53.5	58.792	58.544	59.462	66.745		71.483	78.879	83.886
53.6	58.944	58.697	59.629	66.927		71.677	79.081	84.088
53.7	59.095	58.851	59.796	67.11		71.871	79.284	84.291
53.8	59.246	59.005	59.963	67.293		72.066	79.486	84.493
53.9	59.398	59.158	60.13	67.476		72.26	79.689	84.695
54	59.549	59.312	60.297	67.659		72.455	79.891	84.897
54.1	59.701	59.465	60.464	67.842		72.65	80.094	85.099
54.2	59.853	59.619	60.631	68.024		72.845	80.296	85.301
54.3	60.004	59.772	60.798	68.207		73.04	80.499	85.503
54.4	60.156	59.925	60.965	68.39		73.235	80.701	85.705
54.5	60.307	60.079	61.132	68.573		73.43	80.904	85.908
54.6	60.459	60.232	61.3	68.756		73.625	81.107	86.11
54.7	60.61	60.386	61.467	68.939		73.82	81.311	86.311
54.8	60.762	60.539	61.634	69.122		74.014	81.514	86.514
54.9	60.913	60.693	61.801	69.306		74.208	81.717	86.716

r = radial distance of HPDV measurement, from center of diagnostic plate = millimeters

z = vertical distance from top surface datum of diagnostic plate = millimeters

t = time from detonator circuit current start = microseconds

r →	0	10	20	25	30	35	40	50
t								
55	61.065	60.846	61.968	69.489		74.403	81.919	86.918
55.1	61.216	61	62.135	69.672		74.598	82.122	87.12
55.2	61.368	61.154	62.302	69.855		74.793	82.324	87.322
55.3	61.519	61.307	62.47	70.039		74.988	82.527	87.523
55.4	61.671	61.461	62.638	70.222		75.183	82.729	87.725
55.5	61.823	61.615	62.806	70.406		75.377	82.932	87.927
55.6	61.974	61.769	62.973	70.589		75.572	83.134	88.129
55.7	62.126	61.922	63.141	70.773		75.766	83.337	88.331
55.8	62.278	62.076	63.308	70.956		75.961	83.539	88.533
55.9	62.429	62.23	63.475	71.139		76.155	83.742	88.735
56	62.581	62.384	63.643	71.323		76.351	83.944	88.937
56.1	62.732	62.538	63.81	71.507		76.546	84.147	89.139
56.2	62.884	62.692	63.978	71.691		76.74	84.35	89.341
56.3	63.036	62.845	64.145	71.874		76.935	84.552	89.543
56.4	63.187	62.999	64.312	72.057		77.13	84.755	89.745
56.5	63.339	63.153	64.48	72.241		77.325	84.957	89.947
56.6	63.491	63.307	64.647	72.425		77.52	85.159	90.148
56.7	63.643	63.461	64.815	72.608		77.715	85.362	90.35
56.8	63.794	63.615	64.982	72.791		77.91	85.565	90.552
56.9	63.946	63.77	65.149	72.975		78.106	85.767	90.753
57	64.098	63.924	65.317	73.158		78.301	85.97	90.955
57.1	64.25	64.078	65.484	73.342		78.496	86.172	91.157
57.2	64.402	64.232	65.652	73.525		78.691	86.375	91.359
57.3	64.554	64.386	65.819	73.709		78.886	86.578	91.56
57.4	64.706	64.541	65.987	73.892		79.081	86.78	91.762
57.5	64.858	64.695	66.154	74.075		79.276	86.983	91.964
57.6	65.01	64.849	66.322	74.259		79.471	87.186	92.166
57.7	65.163	65.004	66.49	74.442		79.665	87.388	92.368
57.8	65.315	65.158	66.657	74.625		79.861	87.591	92.57
57.9	65.467	65.313	66.825	74.808		80.055	87.794	92.771
58	65.619	65.467	66.992	74.991		80.249	87.997	92.973
58.1	65.771	65.622	67.16			80.444	88.2	93.175
58.2	65.923	65.777	67.327			80.639	88.403	93.377
58.3	66.075	65.932	67.495			80.834	88.605	93.578
58.4	66.227	66.087	67.663			81.029	88.808	93.78
58.5	66.379	66.241	67.831			81.224	89.01	93.981
58.6	66.532	66.396	67.998			81.419	89.213	94.183
58.7	66.684	66.55	68.165			81.613	89.417	94.384
58.8	66.836	66.705	68.333			81.808	89.62	94.586
58.9	66.988	66.859	68.501			82.001	89.822	94.788

r = radial distance of HPDV measurement, from center of diagnostic plate = millimeters

z = vertical distance from top surface datum of diagnostic plate = millimeters

t = time from detonator circuit current start = microseconds

r →	0	10	20	25	30	35	40	50
t								
59	67.14	67.014	68.669			82.195	90.025	94.989
59.1	67.293	67.168	68.836			82.389	90.226	95.191
59.2	67.445	67.323	69.004			82.583	90.428	95.392
59.3	67.597	67.478	69.172			82.777	90.63	95.594
59.4	67.749	67.633				82.972	90.832	95.795
59.5	67.902	67.787				83.167	91.034	95.997
59.6	68.054	67.942				83.362	91.237	96.199
59.7	68.207	68.097				83.557	91.439	96.401
59.8	68.359	68.253				83.752	91.641	96.603
59.9	68.511	68.408				83.947	91.844	96.805
60	68.664	68.563				84.141	92.046	97.007
60.1	68.816	68.718				84.336	92.248	97.208
60.2	68.969	68.873				84.531	92.45	97.41
60.3	69.122	69.028				84.725	92.651	97.612
60.4	69.274	69.184				84.919	92.854	97.813
60.5	69.426	69.339				85.114	93.056	98.015
60.6	69.579	69.495				85.309	93.258	98.216
60.7	69.731	69.65				85.504	93.46	98.417
60.8	69.884	69.805				85.698	93.663	98.619
60.9	70.036	69.961				85.893	93.865	98.82
61	70.189	70.116				86.087	94.068	99.021
61.1	70.341	70.272					94.27	99.222
61.2	70.494	70.428					94.471	99.423
61.3	70.647	70.584					94.673	99.624
61.4	70.8	70.74					94.875	99.825
61.5	70.952	70.896					95.076	100.03
61.6	71.105	71.051					95.278	100.23
61.7	71.259	71.207					95.48	100.43
61.8	71.412	71.362					95.681	100.63
61.9	71.565	71.519					95.882	100.83
62	71.718	71.675					96.083	101.03
62.1	71.871	71.832					96.285	101.23
62.2	72.024	71.988					96.486	101.43
62.3	72.177	72.144					96.686	
62.4	72.33	72.3					96.886	
62.5	72.483	72.456					97.087	
62.6	72.635	72.612					97.288	
62.7	72.788	72.767					97.489	
62.8	72.941	72.922					97.69	
62.9	73.093	73.077					97.892	

r = radial distance of HPDV measurement, from center of diagnostic plate = millimeters

z = vertical distance from top surface datum of diagnostic plate = millimeters

t = time from detonator circuit current start = microseconds

r →	0	10	20	25	30	35	40	50
t								
63	73.245	73.233						
63.1	73.398	73.387						
63.2	73.55	73.542						
63.3	73.702	73.697						
63.4	73.855	73.852						
63.5	74.008	74.007						
63.6	74.161	74.163						
63.7	74.314	74.319						
63.8	74.467	74.475						
63.9	74.62	74.631						
64	74.774	74.786						
64.1	74.927	74.942						
64.2	75.081	75.096						
64.3	75.234	75.251						
64.4	75.388	75.406						
64.5	75.542	75.562						
64.6	75.696	75.718						
64.7	75.85	75.874						
64.8	76.004	76.03						
64.9	76.158	76.186						
65	76.313	76.343						
65.1	76.468	76.499						
65.2	76.622	76.655						
65.3	76.777	76.811						
65.4	76.932	76.969						
65.5	77.086	77.125						
65.6	77.24	77.281						
65.7	77.393	77.437						
65.8	77.547	77.593						
65.9	77.701	77.75						
66	77.855	77.905						
66.1	78.009	78.061						
66.2	78.163	78.217						
66.3	78.317	78.374						
66.4	78.471	78.531						
66.5	78.626	78.688						
66.6	78.781	78.845						
66.7	78.936	79.001						
66.8	79.091	79.158						
66.9	79.246	79.315						

r = radial distance of HPDV measurement, from center of diagnostic plate = millimeters

z = vertical distance from top surface datum of diagnostic plate = millimeters

t = time from detonator circuit current start = microseconds

r →	0	10	20	25	30	35	40	50
t								
67	79.401	79.473						
67.1	79.556	79.631						
67.2	79.712	79.789						
67.3	79.867	79.946						
67.4	80.023	80.104						
67.5	80.179	80.261						
67.6	80.335	80.419						
67.7	80.491	80.577						
67.8	80.646	80.735						
67.9	80.802	80.894						
68	80.958	81.051						
68.1	81.115	81.208						
68.2	81.272	81.365						
68.3	81.428	81.523						
68.4	81.585	81.681						
68.5	81.742	81.838						
68.6	81.899	81.994						
68.7		82.151						
68.8		82.308						
68.9		82.464						
69		82.62						
69.1		82.777						
69.2		82.935						
69.4		83.25						

r = radial distance of HPDV measurement, from center of diagnostic plate = millimeters

z = vertical distance from top surface datum of diagnostic plate = millimeters

t = time from detonator circuit current start = microseconds

CLYINDRICAL AXIS DEAD-ZONE PRESSURE TABLE

Table 5. Tabulated Dead-Zone Pressure of of Jack Rabbit Pretest 2021E PT4

First column: time in microseconds following detonator circuit current start

Second column: pressure in kilobars on cylindrical axis (POINT 00)

tpressure	PT4 Point 00	11.6	0.0000
8	0.0000	11.7	0.0000
8.1	0.0000	11.8	0.0000
8.2	0.0000	11.9	0.0000
8.3	0.0000	12	0.0640
8.4	0.0000	12.1	0.1539
8.5	0.0000	12.2	0.2057
8.6	0.0000	12.3	0.2579
8.7	0.0000	12.4	0.3153
8.8	0.0000	12.5	0.3749
8.9	0.0000	12.6	0.4275
9	0.0000	12.7	0.4692
9.1	0.0000	12.8	0.5024
9.2	0.0000	12.9	0.5223
9.3	0.0000	13	0.5259
9.4	0.0000	13.1	0.4702
9.5	0.0000	13.2	0.3944
9.6	0.0000	13.3	0.3470
9.7	0.0000	13.4	0.2945
9.8	0.0000	13.5	0.2412
9.9	0.0000	13.6	0.1954
10	0.0000	13.7	0.1585
10.1	0.0000	13.8	0.1412
10.2	0.0000	13.9	0.1387
10.3	0.0000	14	0.2478
10.4	0.0000	14.1	4.8329
10.5	0.0000	14.2	13.4729
10.6	0.0000	14.3	49.9417
10.7	0.0000	14.4	85.1462
10.8	0.0000	14.5	90.1592
10.9	0.0000	14.6	93.9282
11	0.0000	14.7	96.6799
11.1	0.0000	14.8	98.0435
11.2	0.0000	14.9	98.4687
11.3	0.0000	15	98.6125
11.4	0.0000	15.1	98.5399
11.5	0.0000	15.2	94.3179

15.3	86.0426	20.2	62.9975
15.4	49.6195	20.3	54.6983
15.5	14.5058	20.4	43.3983
15.6	9.6279	20.5	31.5553
15.7	6.8568	20.6	21.7176
15.8	7.6291	20.7	12.2571
15.9	12.1210	20.8	3.5279
16	17.1048	20.9	-2.4146
16.1	20.0486	21	-6.5846
16.2	22.2073	21.1	-9.7471
16.3	25.9459	21.2	-11.5082
16.4	30.1307	21.3	-9.4106
16.5	32.8947	21.4	-5.0803
16.6	34.9176	21.5	-1.6513
16.7	36.1205	21.6	1.1205
16.8	35.1341	21.7	3.2832
16.9	31.0245	21.8	4.8956
17	25.0639	21.9	6.0617
17.1	19.9884	22	6.8087
17.2	17.2582	22.1	7.1574
17.3	15.5112	22.2	7.0294
17.4	12.3107	22.3	5.7320
17.5	8.8180	22.4	3.4730
17.6	6.9957	22.5	1.5384
17.7	6.4201	22.6	0.1431
17.8	8.3047	22.7	-1.2929
17.9	13.5593	22.8	-2.7191
18	17.9390	22.9	-4.0004
18.1	19.8659	23	-5.2989
18.2	21.7543	23.1	-6.5257
18.3	24.7084	23.2	-7.6455
18.4	32.3761	23.3	-8.0957
18.5	43.6454	23.4	-7.7006
18.6	51.4348	23.5	-7.1717
18.7	54.1701	23.6	-6.5463
18.8	53.7770	23.7	-5.7375
18.9	51.1874	23.8	-4.6924
19	47.3055	23.9	-3.2242
19.1	46.0902	24	-0.8148
19.2	49.6361	24.1	0.8736
19.3	56.0509	24.2	1.9016
19.4	62.5495	24.3	3.5438
19.5	62.6938	24.4	4.4563
19.6	58.6664	24.5	4.5027
19.7	57.6732	24.6	4.2592
19.8	59.3116	24.7	3.9886
19.9	62.0609	24.8	3.6176
20	64.6324	24.9	3.0107
20.1	65.8933	25	2.1070

25.1	0.2392	30	-1.6396
25.2	-0.4373	30.1	-1.6348
25.3	-0.6667	30.2	-1.5338
25.4	-2.0229	30.3	-1.5433
25.5	-2.6347	30.4	-1.4514
25.6	-2.7522	30.5	-1.5818
25.7	-2.6303	30.6	-1.9510
25.8	-2.4157	30.7	-2.2625
25.9	-2.1039	30.8	-2.3805
26	-1.6934	30.9	-2.2572
26.1	-1.1412	31	-2.3296
26.2	-0.6118	31.1	-2.4745
26.3	-0.6168	31.2	-2.8334
26.4	-0.2289	31.3	-2.9485
26.5	0.6189	31.4	-2.6621
26.6	0.9448	31.5	-2.7102
26.7	1.0861	31.6	-2.7543
26.8	1.1550	31.7	-2.4819
26.9	1.0620	31.8	-2.1211
27	0.8601	31.9	-1.9032
27.1	0.6320	32	-2.0930
27.2	0.2553	32.1	-2.2782
27.3	0.0595	32.2	-2.2428
27.4	-0.0593	32.3	-2.0032
27.5	-0.3100	32.4	-2.0610
27.6	-0.5319	32.5	-2.4107
27.7	-0.7858	32.6	-2.2987
27.8	-1.1230	32.7	-2.2423
27.9	-1.3010	32.8	-2.5156
28	-1.3133	32.9	-2.6594
28.1	-1.4155	33	-2.8895
28.2	-1.5576	33.1	-2.9179
28.3	-1.6082	33.2	-2.7926
28.4	-1.5761	33.3	-2.8850
28.5	-1.5680	33.4	-2.8695
28.6	-1.5245	33.5	-2.8862
28.7	-1.4773	33.6	-2.9349
28.8	-1.4235	33.7	-2.8274
28.9	-1.2353	33.8	-2.7450
29	-1.1781	33.9	-2.6384
29.1	-1.2799	34	-2.4584
29.2	-1.3082	34.1	-2.3309
29.3	-1.5531	34.2	-2.2695
29.4	-1.5735	34.3	-2.1580
29.5	-1.4206	34.4	-1.9668
29.6	-1.4899	34.5	-1.9761
29.7	-1.5513	34.6	-2.0237
29.8	-1.6031	34.7	-1.9482
29.9	-1.6219	34.8	-1.9572

34.9	-1.9912	39.8	-2.3778
35	-1.9596	39.9	-2.4323
35.1	-2.2276	40	-2.5192
35.2	-2.5905	40.1	-2.4219
35.3	-2.4694	40.2	-2.4514
35.4	-2.3975	40.3	-2.6947
35.5	-2.5844	40.4	-2.6773
35.6	-2.6326	40.5	-2.4172
35.7	-2.6008	40.6	-2.4255
35.8	-2.6143	40.7	-2.4195
35.9	-2.6321	40.8	-2.0121
36	-2.5342	40.9	-1.7637
36.1	-2.5178	41	-1.5506
36.2	-2.3006	41.1	-1.2075
36.3	-1.9654	41.2	-1.3502
36.4	-2.0727	41.3	-1.3811
36.5	-2.3643	41.4	-1.0990
36.6	-2.2028	41.5	-0.9167
36.7	-1.8677	41.6	-0.9452
36.8	-1.9776	41.7	-0.6128
36.9	-2.0001	41.8	-0.2571
37	-1.9044	41.9	-0.7208
37.1	-1.9074	42	-0.9789
37.2	-2.0021	42.1	-0.9387
37.3	-2.1994	42.2	-1.0003
37.4	-2.2059	42.3	-0.7868
37.5	-2.2473	42.4	-0.7946
37.6	-2.1337	42.5	-0.8884
37.7	-2.2261	42.6	-0.8156
37.8	-2.5751	42.7	-0.7013
37.9	-2.5503	42.8	-0.7481
38	-2.5626	42.9	-0.9261
38.1	-2.5661	43	-0.7260
38.2	-2.6053	43.1	-0.6345
38.3	-2.6559	43.2	-0.6587
38.4	-2.4939	43.3	-0.6718
38.5	-2.4185	43.4	-0.5524
38.6	-2.3609	43.5	-0.3350
38.7	-2.2547	43.6	-0.1691
38.8	-2.2549	43.7	0.1720
38.9	-2.2467	43.8	0.2168
39	-2.1497	43.9	-0.0408
39.1	-2.0178	44	-0.1558
39.2	-1.9244	44.1	-0.1283
39.3	-2.0515	44.2	-0.0887
39.4	-2.1406	44.3	-0.0636
39.5	-2.1747	44.4	0.0020
39.6	-2.2827	44.5	-0.0239
39.7	-2.3609	44.6	-0.0298

44.7	-0.1894	49.6	-0.4626
44.8	-0.5651	49.7	-0.3966
44.9	-0.5848	49.8	-0.3163
45	-0.5075	49.9	-0.2945
45.1	-0.6513	50	-0.1258
45.2	-0.7751	50.1	-0.2184
45.3	-0.1831	50.2	-0.3753
45.4	0.1106	50.3	-0.4273
45.5	-0.2232	50.4	-0.4365
45.6	-0.2416	50.5	-0.3237
45.7	-0.2550	50.6	-0.2571
45.8	-0.3973	50.7	-0.2541
45.9	-0.6755	50.8	-0.2045
46	-0.9222	50.9	-0.7815
46.1	-0.5992	51	-0.7631
46.2	-0.0074	51.1	0.2097
46.3	0.0695	51.2	0.1355
46.4	-0.6092	51.3	-0.1567
46.5	-0.9253	51.4	0.0299
46.6	-0.5217	51.5	0.0195
46.7	-0.4083	51.6	-0.0384
46.8	-0.2834	51.7	-0.0082
46.9	-0.1730	51.8	-0.0041
47	0.0264	51.9	-0.0703
47.1	0.1213	52	0.5009
47.2	-0.8601	52.1	0.4064
47.3	-1.6022	52.2	-0.9487
47.4	-0.8525	52.3	-0.7870
47.5	-0.9071	52.4	-0.0999
47.6	-1.3829	52.5	-0.1807
47.7	-0.3998	52.6	-0.1438
47.8	0.0106	52.7	-0.2286
47.9	-0.2559	52.8	-1.1153
48	0.1185	52.9	-0.9214
48.1	0.4890	53	-0.0067
48.2	0.7823	53.1	-0.1360
48.3	1.7556	53.2	-0.1348
48.4	2.0978	53.3	0.2773
48.5	1.1782	53.4	0.3507
48.6	1.2754	53.5	0.2009
48.7	1.7376	53.6	0.4184
48.8	0.7336	53.7	0.3093
48.9	0.1410	53.8	0.0842
49	0.3144	53.9	0.9454
49.1	0.0639	54	0.8688
49.2	-0.2733	54.1	-0.0265
49.3	-0.4648	54.2	0.1147
49.4	-0.6721	54.3	0.1886
49.5	-0.6344	54.4	0.1938

54.5	0.1832	59.4	0.6125
54.6	0.0131	59.5	0.7762
54.7	-0.2437	59.6	0.5258
54.8	-0.5258	59.7	0.3075
54.9	-0.3059	59.8	0.3313
55	0.1836	59.9	0.2324
55.1	0.3204	60	0.2153
55.2	0.2979	60.1	0.2182
55.3	0.2817	60.2	0.1148
55.4	0.2017	60.3	0.0088
55.5	0.0616	60.4	-0.0903
55.6	0.0813	60.5	-0.0942
55.7	0.2165	60.6	-0.0541
55.8	0.3064	60.7	0.2589
55.9	0.8074	60.8	0.5154
56	0.9379	60.9	0.6701
56.1	0.3169	61	0.9503
56.2	0.1281	61.1	0.9656
56.3	0.1680	61.2	0.7363
56.4	0.1837	61.3	0.5061
56.5	0.2293	61.4	0.8208
56.6	0.2927	61.5	1.1807
56.7	0.3011	61.6	-0.2552
56.8	0.2125	61.7	-0.2519
56.9	0.2636	61.8	0.8628
57	0.6164	61.9	0.1244
57.1	0.5584	62	-0.2468
57.2	0.3133	62.1	-0.3213
57.3	0.0166	62.2	-0.4891
57.4	0.0859	62.3	-1.4943
57.5	0.4566	62.4	-1.3934
57.6	0.3456	62.5	-1.3367
57.7	0.2783	62.6	-1.9573
57.8	0.8250	62.7	-0.2072
57.9	0.8276	62.8	-0.1161
58	0.2162	62.9	-0.8525
58.1	-0.1912	63	0.3326
58.2	-0.1527	63.1	0.5650
58.3	0.2267	63.2	0.3203
58.4	0.5721	63.3	0.7847
58.5	0.6149	63.4	2.4155
58.6	0.2432	63.5	2.6134
58.7	0.2874	63.6	2.3186
58.8	0.3250	63.7	2.3290
58.9	-0.2179	63.8	2.0218
59	-0.1117	63.9	2.4709
59.1	0.5585	64	2.1938
59.2	0.5387	64.1	0.9654
59.3	0.4522	64.2	1.1413

64.3	2.4371
64.4	2.1564
64.5	1.7202
64.6	1.4758
64.7	1.3629
64.8	1.2694
64.9	0.5401
65	-0.3548
65.1	-0.6328
65.2	0.3793
65.3	0.1950
65.4	-1.1751
65.5	-1.3589
65.6	-1.8624
65.7	-1.1398
65.8	-0.3855
65.9	0.2695
66	0.8793
66.1	0.9791
66.2	1.7728
66.3	1.5808
66.4	1.4889
66.5	2.0558
66.6	2.2476
66.7	2.0407
66.8	1.7819
66.9	1.9742
67	1.9125
67.1	2.2132
67.2	1.6565
67.3	0.9147
67.4	1.9565
67.5	2.5960
67.6	2.1931
67.7	1.4885
67.8	2.6503
67.9	2.7962
68	1.3817
68.1	0.4968
68.2	0.1222
68.3	1.4447
68.4	2.0069
68.5	0.4353
68.6	-0.6082
68.7	-0.5832

APPENDIX A – COMPUTER READABLE FILE NAMES

To obtain computer readable files containing the data shown in this report, contact:

Mark M. Hart
Lawrence Livermore National Laboratory
7000 East Avenue
P.O. Box 808
Livermore, California, 94550

Telephone: 925-423-4770

Email: hart6@llnl.gov

DATA CONTENT	FILE NAME
PDV velocity data (m/s) for 2021E PT4	JackRabbitPretestVelocityPT4.xls
Position data (mm) for 2021E PT4	JackRabbitPretestPositionPT4.xls
Pressure data (kilobar) on center axis, Point 00 for all 2021E experiments	Pressure00VsTime_JR.txt
Diagnostic Plate Profile Vs Time PT4	ProfileVsTime_PT4_final.xls