

# THE DRIFT VELOCITY OF ELECTRONS IN NITROGEN\*

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In the previous communication (pp. 735–9 of the present issue) measurements of electron drift velocities in hydrogen were reported for  $E/p$  values in the range 12–50  $\text{V cm}^{-1} \text{ torr}^{-1}$  at  $20^\circ\text{C}$ . These results were obtained using a modified form of the Bradbury–Nielsen shutter apparatus. This same drift tube has been used to determine electron drift velocities in nitrogen. Cylinder grade nitrogen was used and admitted to the system through liquid air traps.

For these measurements  $E/p$  was restricted to the range  $0 < E/p < 80$  so that ionizing collisions in the drift space would not have an appreciable effect on the results (see previous paper). For each value of  $E/p$  the measured drift velocity  $W'$  was determined for several pressures and the results were extrapolated to large pressures. In this way an allowance can be made for diffusion effects (Lowke 1962) and the true drift velocity  $W$  can be obtained. The values of  $W$  obtained by this procedure are given in Table 1.

TABLE 1  
ELECTRON DRIFT VELOCITIES IN NITROGEN

$E/p$ at $20^\circ\text{C}$ ( $\text{V cm}^{-1} \text{ torr}^{-1}$ )	$W \times 10^{-7}$ (cm/sec)	$E/p$ at $20^\circ\text{C}$ ( $\text{V cm}^{-1} \text{ torr}^{-1}$ )	$W \times 10^{-7}$ (cm/sec)
15	0.569	45	1.44
18	0.645	50	1.62
20	0.703	55	1.77
25	0.837	60	1.95
30	0.97	70	2.24
35	1.11	75	2.43
40	1.29	80	2.53

The values of  $W'$  could be determined to about 1% at  $E/p = 20$  and the errors increased to 2% at  $E/p = 80$ . Additional errors arose from the extrapolation procedure and it is estimated that the present results are accurate to 2% at  $E/p = 20$  and about 4% at  $E/p = 80$ . The results are in good agreement with those of Lowke (1963) for  $E/p \leq 20$ , and Prasad and Smeaton (1967) for  $E/p < 40$ .

## References

- LOWKE, J. J. (1962).—*Aust. J. Phys.* **15**, 39.  
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