

## 77148 / 89788 / 08482 Differentiation Disks X Factor / V Factor / X + V Factors

Use for the presumptive identification of *Haemophilus* species on the basis of their requirements for X or V growth factor or both.

Member of the genus *Haemophilus* require hemin (X factor) and/or nicotinamid-adenin-dinucleotid (V-factor). Together with the X factor (Fluka 77148) and the V factor (Fluka 89788) the need for either one or both factors provides the main means of differentiation of these organisms. *Haemophilus* species requiring both X and V factors exhibit growth only in the vicinity of the X + V factor disks (Fluka 08482).

### Composition:

One package contains 50 test disks. Sterile filter paper disks (diameter 6mm):  
impregnated with hemin and nicotinamide adenine dinucleotide (X + V factor disks; Fluka 08482).  
impregnated with hemin (X factor disks; Fluka 77148).  
impregnated with nicotinamide adenine dinucleotide (V factor disks; Fluka 89788).

### Directions:

Inoculate the surface of a Blood Agar (Fluka 70133) plate or Brain Heart Infusion Agar (Fluka 70138) plate with the test organisms by streaking or surface spreading. Aseptically, place the X and V factor disks on the plate. Incubate the plates at 35-37°C for 24-48 hours.

Recommended Disk Positions on the Agar Plate:

Disk	Place
X factor disk	12 O'clock
V factor disk	4 O'clock
X + V factor disk	8 O'clock

Observe the growth in the neighborhood of the disk. The test organism requiring X factor grows only in the vicinities of X disks, those who require V factor grows only in the vicinities of V disks and those who require V and X factor grows only in the vicinities of X + V disks.

### Note:

*Use known strains of Haemophilus influenza strains to monitor the performance of the differentiation disks and the medium.*

*Do not use heavy suspension of the test organisms as X- or V-factor carryover from the primary growth medium may take place.*

### Quality control:

Cultural response observed on Brain Blood Agar (Fluka 70133) plate or Brain Heart Infusion Agar (Fluka 70138) after 24-48 hours at 35-37°C.

Test Organisms (ATCC)	Without growth factor	X factor	V factor	X + V factor
<i>Haemophilus influenzae</i> (35056)	-	-	-	+
<i>Haemophilus parainfluenza</i> (7901)	-	-	+	+
<i>Haemophilus ducreyi</i> (27722)	-	+	-	+
<i>Bordetella pertussi</i> (13048)	+	+	+	+

## References:

1. D.J. Davis, *J. Infect. Dis.*, 21, 392 (1917)
2. T. Thjotta, O.T. Avery, *J. Exp. Med.*, 34, 97 (1921)  
A. Lwoff, M. Lwoff, *Proc. R. Soc.*, 122, 352 London (1937)
3. R.H. Parker, P.D. Hoepflich, *Am. J. Clin. Pathol.*, 37, 319 (1962)
4. E.L. Biberstein, P.D. Mini, M.G. Bills, *J. Bacteriol.*, 86, 814 (1963)
5. D.C. White, S. Granick, *J. Bacteriol.*, 85, 842 (1963)
6. P.R. Murray, E.J. Baron, M.A. Pfaller, F.C. Tenover, R.H. Tenover, *Manual of Clinical Microbiology*. 6<sup>th</sup> ed. ASM, Washington, D.C. (1995)
7. A.E. Greenberg, R.R. Trussell, L.S. Clesceri (Eds.), *Standard Methods for the Examination of Water and Wastewater*, 16<sup>th</sup> ed., A.P.H.A, Washington, D.C. (1985)
8. M. Kilian, *Haemophilus*. In *Manual of Clinical Microbiology*, Edited by A. Balows, W.J. Hausler, K.L. Herrmann, H.D. Isenberg, H.J. Shadomy., p 463. Washington, DC:American Society for Microbiology (1991)