

**Pasif Dozimetre-Tüpleri - Zaman Ağırlıklı Ortalama (TWA) Tüpleri**

| Örneklenmek İstenen<br>Gaz veya Buharın<br>Kimyasal Formülü                              | Tüp No. & Kimyasal Adı |                      | Ölçüm<br>Aralığı<br>(ppm) | Ölçüm<br>Zamanı<br>(saat) | Renk Değişimi  |               | Ömrü | Not | TLV-TWA, C<br>(ACGIH)<br>(ppm) |
|------------------------------------------------------------------------------------------|------------------------|----------------------|---------------------------|---------------------------|----------------|---------------|------|-----|--------------------------------|
|                                                                                          |                        |                      |                           |                           | Orjinal        | Dönüşen Renk  |      |     |                                |
| Acetaldehyde<br>CH <sub>3</sub> CHO                                                      | 91D                    | Formaldehyde         | 0.1-20                    | 1-10                      | Yellow         | Reddish brown | 1*   |     | C 25                           |
|                                                                                          | 151D                   | Acetone              | 4-1200                    | 1-10                      | Yellow         | Reddish brown | 2*   | T   |                                |
|                                                                                          | 152D                   | Methyl ethyl kentone | 1.2-360                   | 1-10                      | Yellow         | Reddish brown | 2*   | T   |                                |
| Acetic acid<br>CH <sub>3</sub> CO <sub>2</sub> H                                         | 81D                    | Acetic acid          | 0.5-100                   | 1-10                      | Purple         | Yellow        | 3    | T   | 10                             |
| Acetic anhydride<br>(CH <sub>3</sub> CO) <sub>2</sub> O                                  | 81D                    | Acetic acid          | 0.3-60                    | 1-10                      | Purple         | Yellow        | 3    | T   | 1                              |
| Acetone<br>CH <sub>3</sub> COCH <sub>3</sub>                                             | 151D                   | Acetone              | 5-1500                    | 1-10                      | Yellow         | Reddish brown | 2*   | T   | 500                            |
|                                                                                          | 152D                   | Methyl ethyl ketone  | 1.4-420                   | 1-10                      | Yellow         | Reddish brown | 2*   | T   |                                |
| Ammonia<br>NH <sub>3</sub>                                                               | 3D                     | Ammonia              | 2.5-1000                  | 0.5-10                    | Purple         | Yellow        | 3    | T   | 25                             |
|                                                                                          | 3DL                    | Ammonia              | 0.1-10                    | 1-10                      | Pink           | Yellow        | 2    | TH  |                                |
| Benzene<br>C <sub>6</sub> H <sub>6</sub>                                                 | 122DL                  | Toluene              | 2.4-600                   | 1-10                      | white          | Brown         | 2    |     | 0.5                            |
| 1,3-Butadiene<br>CH <sub>2</sub> :CHCH:CH <sub>2</sub>                                   | 174D                   | 1,3-Butadiene        | 1.3-200                   | 1-8                       | Reddish purple | Pale brown    | 2    | T   | 2                              |
| Carbon dioxide<br>CO <sub>2</sub>                                                        | 2D                     | Carbon dioxide       | 0.02-12%                  | 0.5-10                    | Pale red       | Yellow        | 2    | T   | 5000                           |
| Carbon monoxide<br>CO                                                                    | 1D                     | Carbon monoxide      | 1.04-2000                 | 0.5-48                    | Pale yellow    | Brown         | 2    |     | 25                             |
|                                                                                          | 1DL                    | Carbon monoxide      | 0.4-400                   | 0.5-24                    | Pale yellow    | Brown         | 2*   |     |                                |
| Chlorine<br>Cl <sub>2</sub>                                                              | 8D                     | Chlorine             | 0.08-100                  | 0.5-24                    | White          | Yellow        | 2    |     | 0.5                            |
|                                                                                          | 132D                   | Trichloroethylene    | 2.4-240                   | 1-8                       | Yellow         | Purple        | 1*   | T   |                                |
| Cumene<br>C <sub>6</sub> H <sub>5</sub> CH(CH <sub>3</sub> ) <sub>2</sub>                | 122DL                  | Toluene              | 3.4-850                   | 1-10                      | White          | Brown         | 2    |     | 50                             |
| 1,2-Dichloroethylene<br>ClCH:CHCl                                                        | 174D                   | 1,3-Butadiene        | 3.8-600                   | 1-8                       | Reddish purple | Pale brown    | 2    | T   | 200                            |
|                                                                                          | 132D                   | Trichloroethylene    | 6-600                     | 1-8                       | Yellow         | Purple        | 1*   | T   |                                |
| Dimethylamine<br>(CH <sub>3</sub> ) <sub>2</sub> NH                                      | 3D                     | Ammonia              | 1.9-750                   | 0.5-10                    | Purple         | Yellow        | 3    | T   | 5                              |
| N,N-Dimethylethylamine<br>C <sub>2</sub> H <sub>5</sub> N(CH <sub>3</sub> ) <sub>2</sub> | 3D                     | Ammonia              | 4-1600                    | 0.5-10                    | Purple         | Yellow        | 3    | T   |                                |
| Ethanol<br>C <sub>2</sub> H <sub>5</sub> OH                                              | 112D                   | Ethanol              | 100-25000                 | 1-10                      | Yellow         | Brown         | 3    |     |                                |
| Ethyl benzene<br>C <sub>6</sub> H <sub>5</sub> C <sub>2</sub> H <sub>5</sub>             | 122DL                  | Toluene              | 2.8-700                   | 1-10                      | White          | Brown         | 2    |     | 20                             |
| Ethylene<br>CH <sub>2</sub> :CH <sub>2</sub>                                             | 174D                   | 1,3-Butadiene        | 1.5-240                   | 1-8                       | Reddish purple | Pale brown    | 2    | T   | 200                            |
| Formaldehyde<br>HCHO                                                                     | 91D                    | Formaldehyde         | 0.1-20                    | 1-10                      | Yellow         | Reddish brown | 1*   |     | C 0.3                          |
| Formic acid<br>HCO <sub>2</sub> H                                                        | 81D                    | Acetic acid          | 0.55-110                  | 1-10                      | Purple         | Yellow        | 3    | T   | 5                              |
| Furfural<br>C <sub>5</sub> H <sub>4</sub> O <sub>2</sub>                                 | 91D                    | Formaldehyde         | 0.3-60                    | 1-10                      | Yellow         | Reddish brown | 1*   |     | 2                              |
| Hydrazine<br>N <sub>2</sub> H <sub>4</sub>                                               | 3D                     | Ammonia              | 1.6-650                   | 0.5-10                    | Purple         | Yellow        | 3    | T   | 0.01                           |
| Hydrogen chloride<br>HCl                                                                 | 14D                    | Hydrogen chloride    | 1-100                     | 1-10                      | Yellow         | Purple        | 3    | TH  | C 2                            |
|                                                                                          | 132D                   | Trichloroethylene    | 1.8-180                   | 1-8                       | Yellow         | Purple        | 1*   | T   |                                |
| Hydrogen cyanide<br>HCN                                                                  | 12D                    | Hydrogen cyanide     | 1-200                     | 1-10                      | Yellow         | Pink          | 2    |     | C 4.7                          |
| Hydrogen fluoride<br>HF                                                                  | 14D                    | Hydrogen chloride    | 2.5-250                   | 1-10                      | Yellow         | Purple        | 3    | TH  | 0.5                            |
|                                                                                          | 17D                    | Hydrogen fluoride    | 1-100                     | 1-10                      | Yellow         | Purple        | 3    | TH  |                                |
| Hydrogen peroxide<br>H <sub>2</sub> O <sub>2</sub>                                       | 32D                    | Hydrogen peroxide    | 0.5-40                    | 1-10                      | White          | Yellow        | 3    | T   | 1                              |

T: Sıcaklık Düzeltmesi H: Nem Düzeltmesi

\* Soğuk tutmak gereklidir!

Mesh: Düzeltme Tablosu

| Örneklenecek İstenen Gaz veya Buharın Kimyasal Formülü                                        | Tüp No. & Kimyasal Adı |                     | Ölçüm Aralığı (ppm) | Ölçüm Zamanı (saat) | Renk Değişimi  |               | Raf Ömrü (yıl) | Not | TLV-TWA, C (ACGIH) (ppm) |
|-----------------------------------------------------------------------------------------------|------------------------|---------------------|---------------------|---------------------|----------------|---------------|----------------|-----|--------------------------|
|                                                                                               |                        |                     |                     |                     | Orjinal        | Dönüşen Renk  |                |     |                          |
| Hydrogen sulphide<br>H <sub>2</sub> S                                                         | 4D                     | Hydrogen sulphide   | 0.2-200             | 1-48                | White          | Brown         | 3              |     | 1                        |
| Isoprene<br>CH <sub>2</sub> :C(CH <sub>3</sub> )CH:CH <sub>2</sub>                            | 174D                   | 1,3-Butadiene       | 2.5-400             | 1-8                 | Reddish purple | Pale brown    | 2              | T   |                          |
| Methylamine<br>CH <sub>3</sub> NH <sub>2</sub>                                                | 3DL                    | Ammonia             | 0.19-19             | 1-10                | Pink           | Yellow        | 2              | TH  | 5                        |
| Methyl ethyl ketone<br>CH <sub>3</sub> COC <sub>2</sub> H <sub>5</sub>                        | 152D                   | Methyl ethyl ketone | 2-600               | 1-10                | Yellow         | Reddish brown | 2*             | T   | 200                      |
|                                                                                               | 91D                    | Formaldehyde        | 0.125-25            | 1-10                | Yellow         | Reddish brown | 1*             |     |                          |
|                                                                                               | 151D                   | Acetone             | 6.5-1950            | 1-10                | Yellow         | Reddish brown | 2*             | T   |                          |
| Methyl isobutyl ketone<br>(CH <sub>3</sub> ) <sub>2</sub> CHCH <sub>2</sub> COCH <sub>3</sub> | 151D                   | Acetone             | 11.5-3450           | 1-10                | Yellow         | Reddish brown | 2*             | T   | 20                       |
|                                                                                               | 152D                   | Methyl ethyl ketone | 4-1200              | 1-10                | Yellow         | Reddish brown | 2*             | T   |                          |
| Nitric acid<br>HNO <sub>3</sub>                                                               | 14D                    | Hydrogen chloride   | 0.8-80              | 1-10                | Yellow         | Purple        | 3              | TH  | 2                        |
|                                                                                               | 17D                    | Hydrogen fluoride   | 0.32-32             | 1-10                | Yellow         | Purple        | 3              | TH  |                          |
| Nitrogen dioxide<br>NO <sub>2</sub>                                                           | 9D                     | Nitrogen dioxide    | 0.1-30              | 1-10                | White          | Yellow        | 1*             | T   | 0.2                      |
|                                                                                               | 9DL                    | Nitrogen dioxide    | 0.01-3.0            | 1-24                | White          | Green         | 1*             |     |                          |
| Styrene<br>C <sub>6</sub> H <sub>5</sub> CH:CH <sub>2</sub>                                   | 122DL                  | Toluene             | 26-6500             | 1-10                | White          | Brown         | 2              |     | 20                       |
| Sulphur dioxide<br>SO <sub>2</sub>                                                            | 5DH                    | Sulphur dioxide     | 10-600              | 1-5                 | Bluish purple  | White         | 3              | T   |                          |
|                                                                                               | 5D                     | Sulphur dioxide     | 0.2-100             | 1-10                | Green          | Yellow        | 3              |     |                          |
| Tetrachloroethylene<br>Cl <sub>2</sub> C:CCl <sub>2</sub>                                     | 133D                   | Tetrachloroethylene | 3-150               | 1-8                 | Yellow         | Purple        | 1*             | T   | 25                       |
|                                                                                               | 132D                   | Trichloroethylene   | 1.5-150             | 1-8                 | Yellow         | Purple        | 1*             | T   |                          |
| Toluene<br>C <sub>6</sub> H <sub>5</sub> CH <sub>3</sub>                                      | 122DL                  | Toluene             | 2-500               | 1-10                | White          | Brown         | 2              |     | 20                       |
| Trichloroethylene<br>Cl <sub>2</sub> C:CHCl                                                   | 132D                   | Trichloroethylene   | 3-300               | 1-8                 | Yellow         | Purple        | 1*             | T   | 10                       |
| Triethylamine<br>(C <sub>2</sub> H <sub>5</sub> ) <sub>3</sub> N                              | 3D                     | Ammonia             | 5.3-2100            | 0.5-10              | Purple         | Yellow        | 3              | T   | 1                        |
| Trimethylamine<br>(CH <sub>3</sub> ) <sub>3</sub> N                                           | 3DL                    | Ammonia             | 0.23-23             | 1-10                | Pink           | Yellow        | 2              | TH  | 5                        |
| Vinyl chloride<br>CH <sub>2</sub> :CHCl                                                       | 174D                   | 1,5-Butadiene       | 1.5-240             | 1-8                 | Reddish Purple | Pale brown    | 2              | T   | 1                        |
| Xylene<br>C <sub>6</sub> H <sub>4</sub> (CH <sub>3</sub> ) <sub>2</sub>                       | 122DL                  | Toluene             | 3.4-850             | 1-10                | White          | Brown         | 2              |     | 100                      |

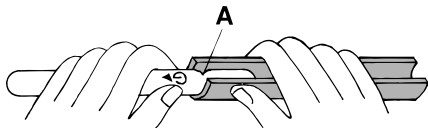
T: Sıcaklık Düzeltmesi H: Nem Düzeltmesi

\* Soğuk tutmak gereklidir!

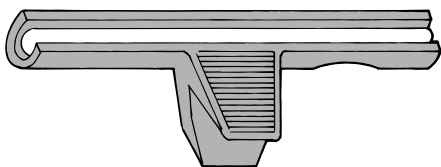
Mesh: Düzeltme Tablosu

### Ölçüm Prosedürleri

- Her Dozi tüpünün kutusunun içinde bulunan yapışkan etikete ölçümün başlama zamanını yazın ve etiketi tüpe yapıştırın.
- Dozi tüpünün "G" işaretli ucunu (No. 710) Tüp Tutucuya yerleştirin ve tüpün kırılma hattından (A) kırın. Kırılan ucunu Tüp Tutucudan çıkarın.



- Dozi-tüpünü tüp tutucunun içine doğru yerleştirin.



- Kişisel örnekleme için Dositüp ile Tüp Tutucuyu gömlek yakasına takın veya alan izleme için işyerinde uygun bir ölçüm noktasına yerleştirin.

- Ölçüm tamamlandığında, bitiş zamanını etikete yazın ve gerçek örnekleme süresini belirleyin:  
= (bitiş zamanı) - (başlangıç zamanı)

- Aşağıdaki formülle ortalama konsantrasyonu (TWA değeri) elde edin.

$$TWA \text{ değeri (ppm)} = \frac{\text{Dozi-tüp okuması (ppm*saat)}}{\text{Gerçek okuma zamanı (saat)}}$$

Gerçek okuma zamanı (saat)

