



## TECHNICAL BULLETIN

### DESIGN GUIDANCE FOR PROTECTION OF AREAS WITH UNCLOSEABLE OPENINGS

## 1. INTENDED USE

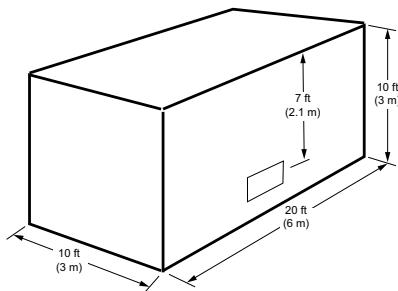
This document provides design guidance for protection of areas with unclosable openings when using nitrogen (IG-100).

## 2. DATA SPECIFICATIONS

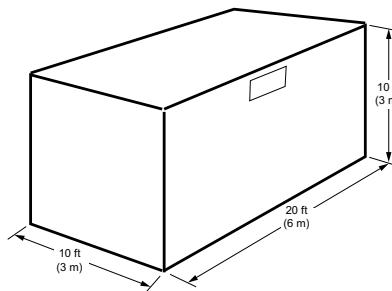
### 2.1 Oxo System Testing with Nitrogen

The 2024/2025 Viking Oxo Inert Gas Extinguishing System testing included discharging nitrogen (IG-100) in a room with an opening to determine if additional nitrogen was required to maintain 85% of the design concentration for the required 10-minute hold time<sup>1,2</sup>. The testing found that, regardless of the Oxo system's geographic location, no additional nitrogen was needed for up to 50% of the design concentration in a room with 0.5% openings of total enclosed boundaries (including walls and floors). Testing was performed in Caledonia, MI (approximately 810 ft/247 m elevation) and Aurora, Colorado (approximately 6,229 ft/1,899 m elevation).

The following tables summarize the nitrogen testing results:



SETUP A



SETUP B



UL REPORT

Table 1: 30% Concentration Target

| Location | Setup | End Discharge Concentration IG-100 | 85% of Concentration | 10-Minute Concentration Measured | Over/Under 85% |
|----------|-------|------------------------------------|----------------------|----------------------------------|----------------|
| Michigan | A     | 34.9                               | 29.7                 | 33.4                             | 3.7            |
|          | B     | 31.6                               | 26.9                 | 28.9                             | 2.0            |
| Colorado | A     | 39.4                               | 33.5                 | 34.0                             | 0.5            |
|          | B     | 37.6                               | 32.0                 | 34.2                             | 2.2            |

Table 2: 50% Concentration Target

| Location | Setup | End Discharge Concentration IG-100 | 85% of Concentration | 10-Minute Concentration Measured | Over/Under 85% |
|----------|-------|------------------------------------|----------------------|----------------------------------|----------------|
| Michigan | A     | 51.3                               | 43.6                 | 45.2                             | 1.6            |
|          | B     | 51.0                               | 43.3                 | 44.5                             | 1.2            |
| Colorado | A     | 59.9                               | 50.9                 | 50.9                             | 0.0            |
|          | B     | 57.7                               | 49.0                 | 50.2                             | 1.2            |

<sup>1</sup> International Organization of Standardization. (2023). *Duration of protection*, section 7.9.2 (ISO 14520-1:2023). ISO.

<sup>2</sup> National Fire Protection Association 2001. (2025). *Duration of protection*, section 7.4.1 (NFPA 2001:2025). NFPA.