

*South-Tek Systems - Nitrogen Generation
Corrosion Inhibiting System*

Designed for: Dry or Preaction Fire Protection Systems (FPS)

1.0 Description of Work

1.1 The Fire Sprinkler Contractor shall provide all required equipment, materials, labor and services needed to install a complete and operational South-Tek Systems *Nitrogen Generation Corrosion Inhibiting System*. This system is designed to service all Dry and/or Preaction FPS or as directed per the Design Engineer. Installation guidelines by the manufacturer shall be followed.

2.0 Sprinkler Contractor shall provide the following:

2.1 Complete System Package shall be as specified:

- 2.1.1 3.0 Nitrogen Generation System
- 2.1.2 4.0 Feed Air (Compressor)
- 2.1.3 5.0 Building Monitoring System (BMS) Alarm Integration
- 2.1.4 6.0 AutoPurge System
- 2.1.5 7.0 Supervisory Gas Monitoring
- 2.1.6 8.0 Air Maintenance Device
- 2.1.7 9.0 System Compliances
- 2.1.8 10.0 System Installation Protocol
- 2.1.9 11.0 System Startup and Technical Training

3.0 Nitrogen Generation System

- 3.1 The Fire Sprinkler Contractor shall provide and install a South-Tek Systems *Nitrogen Generation System* to include the BlastOff™ - *Air Bypass* and *Leak Detection Alarms* (see section 5.0).
- 3.2 Each *Nitrogen Generation System* provided shall be UL 508A - Industrial Control Panel Listed.
- 3.3 A single South-Tek Systems *Nitrogen Generation System* shall provide Supervisory Pressure between 0-60 PSI for up to (20,000) total gallons of sprinkler pipe capacity within all Zones (Zone = sprinkler piping plumbed from a single Riser). For a building containing more than (20,000) total gallons of capacity, consult South-Tek Systems to verify the correct system for the project.
 - 3.3.1 *Nitrogen Generation System* sizing: Add the capacity (in gallons) of each Zone together to get the sum of all Zones, then reference below to size the *Nitrogen Generation System* (see section 4.0 for Air Compressor sizing).
 - 3.3.1.1 Model #:
 - FPS-650 (Type I): 1 - 650 gallons
 - FPS-1250 (Type I): 651 - 1,250 gallons
 - FPS-1750 (Type II): 1,251 - 1,750 gallons
 - FPS-3000 (Type II): 1,751 - 3,000 gallons
 - FPS-6000 (Type II): 3,001-6,000 gallons
 - FPS-15000 (Type III): 6,001 - 15,000 gallons
 - FPS-20000 (Type III): 15,001 - 20,000 gallons

- 3.4 The *Nitrogen Generation System* shall either have an integrated, oil-less air compressor located within the *Nitrogen Generation System's* cabinet (Type I), or a separate oil-bathed air compressor package to be mounted on vibration isolating mounts (Types II & III).
- 3.5 The *Nitrogen Generation System's* cabinet shall be wall or skid mounted.
 - 3.5.1 Wall Mounted Models: FPS-650, FPS-1750, FPS-3000, FPS-6000
 - 3.5.2 Skid Mounted Models: FPS-1250, FPS-15000, FPS-20000
- 3.6 The *Nitrogen Generation System* shall provide a minimum of 98% Nitrogen purity to the FPS.
- 3.7 The Nitrogen purity of the *Nitrogen Generation System* shall be monitored and verified via a hand held portable or wall mounted stationary Quick-Check[®] - *PowerSaver Manifold* (see section 7.0).
- 3.8 The *Nitrogen Generation System* shall be powered by 120VAC requiring a 20 AMP dedicated circuit for the Type I Systems or an 8 AMP dedicated circuit for Type II & III Systems.
- 3.9 For each *Nitrogen Generation System* the manufacturer shall provide a single 28 gallon (Types I & II) or 80 gallon (Type III) Nitrogen Storage Tank. The Nitrogen Storage Tank shall be DOT or ASME rated for 150 PSI and shall be provided with ASME rated 100 PSI Safety Relief valve, on/off valve and ½" NPT I/O fitting.
- 3.10 The *Nitrogen Generation System* and Nitrogen Storage Tank shall be plumbed by the Sprinkler Contractor using ½" copper, galvanized, black steel pipe or approved flex hosing, rated at 175 PSI. Note: if the components are plumbed farther than 250' from each other or from the dry/preaction valves, 1" piping is recommended (consult factory if plumbing between components exceeds 1000').

4.0 Feed Air (Compressor)

- 4.1 Each South-Tek Systems *Nitrogen Generation System* shall be provided with an air compressor package capable of filling the largest Zone of the FPS to pressure within 30 minutes per NFPA 13 Requirements.
 - 4.1.1 Type I *Nitrogen Generation System's* air compressor requirements:
 - 4.1.1.1 The Type I *Nitrogen Generation System* contains an integrated air compressor capable of providing clean, dry, oil free compressed feed air to the *Nitrogen Generation System*.
 - 4.1.1.1.1 A separate, basic air compressor will need to be specified separately in order to achieve the 30 minute fill per NFPA 13 Requirements. Note: if requested, the internal air compressor can be upsized to fulfill the 30 minute requirement as well as provide clean, dry feed air to the *Nitrogen Generation System*.
 - 4.1.1.1.2 An air bypass shall be installed when piping the air compressor and the *Nitrogen Generation System* to the Air Maintenance Device/s. Ball valves shall be installed in line with the piping going to the Air Maintenance Device/s so either air from the air compressor or Nitrogen from the *Nitrogen Generation System* can be used to provide Supervisory Pressure to the FPS.
 - 4.1.2 Type II & III *Nitrogen Generation System* air compressor requirements:
 - 4.1.2.1 Type II & III *Nitrogen Generation System's* shall be provided with an oil-bathed STS-NF-C Series or other air compressor package approved by the manufacturer which is capable of both providing clean, dry, oil free compressed feed air to the *Nitrogen Generation System* and achieving the 30 minute fill per NFPA 13 Requirements.
 - 4.1.2.1.1 Air compressor sizing (Note: The air compressor packages below are shown with the maximum gal. filled within 30 minutes to 40 PSI):
 - 4.1.2.1.1.1 Model #: STS-NF-C-2-J (FPS-1750): 575 gal.

STS-NF-C-3-J (FPS-1750, 3000): 900 gal.
STS-NF-C-4-CH (FPS-1750, 3000, 6,000): 1,100 gal.
STS-NF-C-5-CH (FPS-1750, 3000, 6000, 15000): 1,600 gal.
STS-NF-C-6-CH (FPS-1750, 3000, 6000, 15000, 20000): 2,100 gal.
STS-NF-C-7-CH (FPS-1750, FPS-3000, 6000, 15000, 20000): 2,800 gal.

- 4.1.2.1.2 The air compressor shall be provided with an aftercooler, automatic tank drain, coalescing filter (to remove residual oil) and a refrigerated air dryer package.
- 4.1.2.1.3 ½” copper, galvanized, black steel or approved flex hosing rated at 175 PSI shall be used when plumbing the Air Compressor and Refrigerated Air Dryer. Note: if the components are plumbed farther than 250’ from each other or from the dry/preaction valves, 1” piping is recommended (consult factory if plumbing between components exceeds 1000’).
- 4.1.2.1.4 An air bypass shall be installed when piping the air compressor and the Type II/III *Nitrogen Generation System* to the Air Maintenance Device/s. Ball valves shall be installed in line with the piping going to the Air Maintenance Device/s so either air from the air compressor or Nitrogen from the *Nitrogen Generation System* can be used to provide Supervisory Pressure to the FPS.
- 4.1.2.1.5 Electrical shall be provided for the air compressor per the manufacturer’s specifications (i.e. wire size, voltage, and proper breaker)

5.0 BMS Alarm Integration

5.1 The *Nitrogen Generation System* shall be designed with both an integrated BlastOff™ - *Air Bypass Alarm* and a *Leak Detection System*. Each alarm shall contain an isolated dry contact rated up to 240VAC 16 amps (NC&NO Contacts available). The Fire Sprinkler Contractor shall run a DC or AC signal line in ½” code approved electrical conduit from the *Nitrogen Generation System* to the supervisory circuit on the Building Monitoring System for each of the two alarms.

5.1.1 The BlastOff™ - *Air Bypass Alarm* shall be designed to alarm should a technician inadvertently leave the Nitrogen generator offline (i.e. bypassed by compressed air) or accidentally turned off.

5.1.2 The BlastOff™ - *Leak Detection System* shall send a signal to the Building Monitoring System should significant leaks develop within the FPS piping, prior to them becoming catastrophic and causing supervisory pressure to fall below specification. These leaks shall be addressed immediately by the Fire Sprinkler Contractor in order to minimize unnecessary runtime on the *Nitrogen Generation System*. The BlastOff™ - *Leak Detection System* shall also be designed to send a signal to the Building Monitoring System if there is a failure with the *Nitrogen Generation System* or air compressor.

6.0 AutoPurge System

6.1 A single South-Tek Systems - *AutoPurge System*™ shall be installed per Zone, within the sprinkler pipe network, at an area where water/moisture will not typically collect.

6.2 The *AutoPurge System*™ shall not require any electrical connection AC or DC.

- 6.3 The *AutoPurge System*[™] shall have a connection allowing the Quick-Check[®] *Portable or PowerSaver Manifold* to attach and sample the purity of Nitrogen within the FPS to ensure that proper Nitrogen purity levels have been attained.
- 6.4 The Fire Sprinkler Contractor shall adjust the needle valve (i.e. the black flow control located on the front of the device) on each *AutoPurge System*[™] to purge the FPS per the manufacturer's specifications outlined within the sizing chart located on the back of the device.
- 6.5 The Fire Sprinkler Contractor shall confirm that the ball valve on each *AutoPurge System*[™] is left in the "open" position during normal operation and shut off/taken out of service during hydro testing by turning the ball valve to the "closed" position.

7.0 Supervisory Gas Monitoring – *Purity Sensors*

- 7.1 Furnish either (1) Quick-Check[®] - *Portable Hand Held Nitrogen Purity Sensor per Nitrogen Generation System* (Option A) and/or (1) Quick-Check[®] - *PowerSaver Manifold* per building (Option B).
 - 7.1.1 Option A: The battery operated *Portable Hand Held Nitrogen Purity Sensor* is to be manually connected to the outlet of the *AutoPurge System*[™] during periodic inspections in order to obtain a quick purity reading of the Nitrogen content within any particular Zone.
 - 7.1.2 Option B: Furnish and install (1) Quick-Check[®] - *PowerSaver Manifold* to sample and trend data on the Nitrogen purity content purging from each *AutoPurge System*[™] (*Note: (1) PowerSaver Manifold* can be customized to monitor any number of Zones within a Fire Protection System).
 - 7.1.2.1 The *PowerSaver Manifold* can be provided in a 6-Port, 10 Port or 20 Port design capable for monitoring 6, 10 or 20 Zones.
 - 7.1.2.2 The *PowerSaver Manifold* shall be programmed by the manufacturer to monitor the Nitrogen purity within each Zone, for 5 minutes, once per day. If the Nitrogen content within the Zones meets the 98% purity spec, the *AutoPurge System/s*[™] will remain closed. If the Nitrogen purity spec is not met, the *AutoPurge System/s*[™] shall remain in the "open" position until the Nitrogen purity spec is met (thus allowing the *Nitrogen Generation System* to briefly operate, continuing to introduce pure Nitrogen into the Zone). This is controlled by a PLC which will open and close solenoids within the *PowerSaver Manifold* based on whether or not the purity spec has been achieved.
 - 7.1.2.3 Software shall be provided to show graphically the relationship of the current Nitrogen concentrations within each of the Zones, their rate of change with respect to time and provide visual and audible alarm points. The *PowerSaver Manifold* shall record Nitrogen levels and PSI data to a .CSV file, which can be extracted via SD card or Ethernet (if the Ethernet option is chosen, the Fire Sprinkler Contractor shall provide analog signals (0-10V or 4-20mA)).

- 7.1.2.4 The Fire Sprinkler Contractor shall also connect the *PowerSaver Manifold* to the Building Monitoring System (BMS) with a single twisted pair signal line in ½” code approved electrical conduit for an isolated dry contact rated up to 240VAC 16amp (*Note: This will notify the Building Monitoring System should Nitrogen purity drop below set point within any Zone*).
- 7.1.2.5 The *PowerSaver Manifold* shall be housed within a NEMA box and rated for 110VAC.
- 7.1.2.6 ¼” polyethylene plenum rated tubing shall connect each *AutoPurge System*[™] to the centrally located *PowerSaver Manifold* (tubing to be provided by the *Nitrogen Generation System* manufacturer).

8.0 Air Maintenance Device (Note: Supplied by the Sprinkler Contractor)

- 8.1 The Air Maintenance Device shall be equipped with an adjustable pressure regulator (sized to meet Supervisory Pressure settings) for setting the maximum pressure on the FPS.
- 8.2 The Air Maintenance Device shall be the equivalent of an AMD-1 and not contain a pressure switch.
- 8.3 The Air Maintenance Device shall be installed per the manufacturer’s specifications.

9.0 System Compliances

- 9.1 The South-Tek Systems *Nitrogen Generation Corrosion Inhibiting System* shall be designed, installed, tested, inspected and maintained to comply with all codes and standards relevant to the following specifications:
 - 9.1.1 NFPA 13: Standard for Installation of Sprinkler Systems.
 - 9.1.2 NFPA 25: Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection Systems (FPS).
 - 9.1.3 All devices and products will be in compliance with Section 23.1.5.2 (3) of NFPA 13, Standard for the Installation of Sprinkler Systems, 2013 Edition.

10.0 System Installation Protocol

- 10.1 As specified by the Design Engineer, a South-Tek Systems *Nitrogen Generation System* which includes an integrated *Leak Detection System* and *Air Bypass Alarm* shall be installed. Installation instructions as directed by the manufacturer shall be followed. The *AutoPurge System/s*, *Quick-Check*[®] - *Nitrogen Purity Sensor* (*i.e. Portable Sensor or PowerSaver Manifold*), and all related accessories shall be installed by the Sprinkler Contractor and no party shall remove or tamper with the devices.
 - 10.1.1 The following shall be installed and/or completed during installation of the South-Tek Systems *Nitrogen Generation Corrosion Inhibiting System*:
 - 10.1.1.1 South-Tek Systems *Nitrogen Generation System*
 - 10.1.1.2 Related products (see 4.0 through 8.0)
 - 10.1.1.3 As required, all piping, fittings, valves etc.
 - 10.1.1.4 System compliance and pressure (leak) testing
- 10.2 Operating pressure range of the Dry or Preaction FPS shall be determined by the Fire Sprinkler Contractor. The Fire Sprinkler Contractor shall also set the system Air Maintenance Device accordingly for each Zone to the proper setting. Final settings shall be implemented with input from the manufacturer.

- 10.3 The Fire Sprinkler Contractor shall confirm that all connections between *Nitrogen Purity Sensors* and the specified connection points have been successfully achieved as indicated by the manufacturer.
- 10.4 Following the installation of the *Nitrogen Generation Corrosion Inhibiting System*, the Fire Sprinkler Contractor will test the FPS leak rate to ensure that it conforms to 2007 NFPA 13 requirements (24.2.2.1).

11.0 System Startup and Technical Training

- 11.1 If requested by the Design Engineer, South-Tek Systems shall provide on-site guidance and training following the installation of the *Nitrogen Generation Corrosion Inhibiting System*.
- 11.2 Contact South-Tek Systems; 2940 Orville Wright Way, Suite 600, Wilmington, NC, 28409
Phone: 910-332-4173 for further information.