SOUTH-TEK SYSTEMS – FPS NITROGEN GENERATION

CORROSION INHIBITING SYSTEM

DESIGNED FOR

DRY AND PREACTION

FIRE PROTECTION SYSTEMS (FPS)

1. DESCRIPTION OF WORK
	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. SPRINKLER CONTRACTOR SHALL PROVIDE THE FOLLOWING
	1. Complete System Package shall be as specified:
		1. 3.0 Nitrogen Generation System
		2. 4.0 Feed Air (Compressor)
		3. 5.0 Building Monitoring System (BMS) Alarm Integration
		4. 6.0 AutoPurge System
		5. 7.0 Supervisory Gas Monitoring
		6. 8.0 Air Maintenance Device
		7. 9.0 System Compliances
		8. 10.0 System Installation Protocol
		9. 11.0 System Startup and Technical Training
		10. 12.0 Warranty
3. NITROGEN GENERATION SYSTEM
	1. The Fire Sprinkler Contractor shall provide and install a South-Tek Systems Nitrogen Generation System (requiring a dedicated 120 VAC, 20 AMP circuit) to include the BlastOff™ series alarms as outlined within Section 5.0.
	2. The Nitrogen Generation System shall provide a minimum of 98% Nitrogen purity to the FPS.
		1. The Nitrogen purity of the sprinkler piping shall be monitored and verified via a hand held portable or wall mounted stationary Quick-Check® - *Purity Manifold* (see section 7.0).
	3. Each Nitrogen Generation System provided must be *FM 1035 Approved & UL 508A - Industrial Control Panel Listed.*
	4. A single South-Tek Systems Nitrogen Generation System shall provide Supervisory Pressure between 0-60 PSI for up to (22,500) total gallons of sprinkler pipe capacity within all Zones (Zone = sprinkler piping connected to a single Riser). For a building containing more than (22,500) total gallons of capacity, consult South-Tek Systems to verify the correct system for the project.
		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).
			1. Model #:

FPS-500 (Series 1): 1 - 500 gallons

FPS-900 (Series 1): 501 - 900 gallons

FPS-1650 (Series 2): 901 – 1,650 gallons

FPS-3250 (Series 3): 1,651 – 3,250 gallons

FPS-5000 (Series 3): 3,251 – 5,000 gallons

FPS-10000 (Series 4): 5,001-10,000 gallons

FPS-16500 (Series 4): 10,001-16,500 gallons

FPS-22500 (Series 4): 16,501 - 22,500 gallons

* 1. The Nitrogen Generation System shall have either an integrated, oil-less air compressor located within the Nitrogen Generation System’s cabinet (Series I & 2), or a separate oil-bathed air compressor package to be mounted on vibration isolating mounts (Series 3 & 4). Series 3 & 4 Nitrogen generators shall include all components such as the tank and refrigerated air dryer self-contained within the cabinet, with the exception of the Quick-Fill air compressor.
	2. The Nitrogen Generation System shall be wall or skid mounted.
		1. Wall Mounted Models: Series 1 Nitrogen Generators
			1. For Series 1 Nitrogen Generation Systems (FPS-500 & 900)*,* the manufacturer shall provide a single 28 gallon Nitrogen Storage Tank. The Nitrogen Storage Tank shall be DOT or ASME rated for a minimum of 100 PSI and shall be provided with ASME rated 100 PSI Safety Relief valve, on/off valve and ½” NPT I/O fitting.
			2. The Nitrogen Generation System and Nitrogen Storage Tank shall be connected by the Sprinkler Contractor using ½” black steel pipe, galvanized, copper or approved flex hosing (per local code). Note: if the components are connected further than 100’ from each other or from the dry/preaction valves, 1” piping is recommended (consult factory if connection between components exceeds 1,000’).
		2. Skid Mounted Models: Series 2, 3, 4 Nitrogen Generators
			1. Series 2, 3 or 4 Nitrogen Generation Systems shall be provided with SMART-Trak technology programed into the onboard Programmable Logic Controller (PLC), which shall be capable of being monitored either on the Nitrogen Generation System’s Human Machine Interface (HMI) or remotely.
				1. SMART-Trak shall monitor the average daily leak rate within the sprinkler pipe network (all piping downstream of the nitrogen generator), average leak rate over the month, and historical leak rate.
				2. The SMART-Trak feature shall monitor and trend the hours of operation of the nitrogen generator.
				3. SMART-Trak shall monitor the amount of time the Nitrogen Generation System has spent in Air-Bypass mode (i.e. time in which the Auto Air Bypass has remained active).
				4. SMART-Trak shall provide Service Reminders, set to the manufacturer’s recommended maintenance schedules, as well as log the historical maintenance completed on the system.
				5. SMART-Trak shall include BMS alarm integration for all BlastOff alarms (see Section 5.0).
1. FEED AIR (COMPRESSOR)
	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.
		1. Series 1 & 2 Nitrogen Generation System’s air compressor requirements:
			1. The Series 1 & 2 Nitrogen Generation System contains an integrated air compressor capable of providing clean, dry, oil free compressed feed air to the Nitrogen Generation System, but is not meant for Quick-fill operation.
				1. A separate, basic Quick-fill air compressor will need to be provided by the nitrogen generator manufacturer which will be sized to achieve the 30-minute fill per NFPA 13 Requirements.
				2. The Series 1 or 2 Nitrogen Generation System shall be provided with an integral Auto Air Bypass Alarm, and the piping from the Air Compressor shall run through the Auto Air Bypass Alarm 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.
		2. Series 3 & 4 Nitrogen Generation System air compressor requirements:
			1. Series 3 & 4 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.
				1. Air compressor sizing (air compressor packages below are shown with the maximum gallons filled within 30 minutes to 40 PSI):

Model # (Compatible Nitrogen Generator Model #):

STS-NF-C-2-J (FPS-3250, 5000): 900 gal.

STS-NF-C-5-CS (FPS-3250, 5000, 10000, 16500): 1,650 gal.

STS-NF-C-7-CS (FPS-3250, 5000, 10000, 16500, 22500): 2,100 gal.

STS-NF-C-7HD-CS (FPS-3250, 5000, 10000, 16500, 22500): 2,650 gal.

STS-NF-C-10-CS (FPS-3250, 5000, 10000, 16500, 22500): 3,000 gal.

* + - * 1. The air compressor shall be provided with an aftercooler, rubber vibration isolators, and an automatic tank drain.
				2. ½” black steel, galvanized, copper or approved flex hosing (per local code) shall be used when piping the Air Compressor (Note: If the components are connected further than 100’ from each other or from the dry/preaction valves, 1” piping is recommended. Consult the factory if connection between components exceeds 1,000’).
				3. The Nitrogen Generation System to be provided with an integral Auto Air Bypass Alarm, and the piping from the Air Compressor shall run through the Auto Air Bypass Alarm 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. Electrical shall be provided for the air compressor per the manufacturer’s specifications (i.e. wire size, voltage and proper breaker).
1. BMS ALARM INTEGRATION
	1. The Nitrogen Generation System shall be provided with the integrated BlastOff™ Series alarms (as directed within Sections 5.1.1 and 5.1.2). These alarms shall be programmed into the PLC and connected to the Building Monitoring System (BMS). The connection 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 code approved electrical conduit from the Nitrogen Generation System to the supervisory circuit on the Building Monitoring System.
		1. Series 1, 2, 3, 4 Nitrogen Generation Systems shall include both of the following alarms:
			1. The BlastOff™ I - *Leak Detection System* shall alarm 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.
			2. The BlastOff™ II - *Auto Air Bypass Alarm* to be designed to alarm should a technician inadvertently leave the Nitrogen Generation System offline (i.e. system bypassed by compressed air) or accidentally turn the system off.
		2. Series 2, 3, & 4 Nitrogen Generation Systems shall also include the following alarms:
			1. The BlastOff™ III- *Early Warning System* shall be designed to alarm when there is either a malfunction with the air compressor, Nitrogen Generation System, or significant leak somewhere within the piping network. This feature is designed to also pinpoint the problem area minimizing troubleshooting by the technician (Note: This feature yields an additional (1) year manufacturer’s warranty on the Nitrogen Generation System).
			2. The BlastOff™ IV – *Onboard Purity Alarm* monitors the purity of the nitrogen that is being produced at the Nitrogen Generation System. This alarm shall notify the BMS when the nitrogen purity going into the Fire Protection System drops below 98%. The purity data shall be displayed and graphically trended allowing its history to be viewed remotely or via the HMI on the Nitrogen Generator.
2. AUTOPURGE SYSTEM
	1. A single South-Tek Systems - *AutoPurge System* shall be installed in a remote area on each Zone, within the sprinkler pipe network, at an area where water/moisture will not typically collect.
	2. This device shall not require any electrical connection, AC or DC.
	3. The *AutoPurge System* shall have a connection allowing the Quick-Check® - *Portable* or *SMART-Trak Manifold* to quickly connect and sample the purity of Nitrogen within the FPS, this to ensure that proper Nitrogen purity levels have been attained.
	4. Each *AutoPurge System* is to be provided with a needle valve (i.e. flow control located on the front of the device) which allows the purge to be adjusted based on the size of the different Zones within the building – so that all Zones are purged within two weeks no matter the varying capacity of each Zone.
		1. The Installing Contractor shall adjust the purge rate per the manufacturer’s specifications outlined within the Zone/Flow chart located on the back of the device.
	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. This continual purging ensures high purity nitrogen is continually maintained within the sprinkler piping.
3. SUPERVISORY GAS MONITORING – NITROGEN PURITY SENSORS
	1. Furnish either (1) Quick-Check - *Portable Hand Held Nitrogen Purity Sensor* per project (Option A) and/or (1) Quick-Check - *Purity Manifold* per project (Option B).
		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.
		2. Option B: Furnish and install (1) Quick-Check - *Purity Manifold* to sample and trend data on the Nitrogen purity content purging from each *AutoPurge System.*
			1. *Purity Manifold* shall be provided in either a 1, 6, 10 or 20 port designs capable of monitoring 1, 6, 10 or 20 Zones.
			2. The *Purity Manifold* shall be programmed by the manufacturer to monitor the Nitrogen purity within each Zone, for 3 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. This is controlled by a PLC which will open and close the purging process based on whether or not the purity spec has been achieved.
			3. Software shall be provided to track the relationship of the current Nitrogen concentrations within each of the Zones and their rate of change with respect to time. Visual and audible alarm points shall be provided. The *Purity Manifold* shall record Nitrogen purity 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).
			4. The Fire Sprinkler Contractor shall also connect the *Purity Manifold* to the Building Monitoring System (BMS) with a single twisted pair signal line (½” code approved electrical conduit suggested) to an isolated dry contact rated up to 240VAC 16amp (Note: This will notify the Building Monitoring System should Nitrogen purity drop below the set point within any Zone).
			5. The *Purity Manifold* shall be housed within a NEMA box and rated for 110VAC.
			6. ¼” polyethylene plenum rated tubing shall connect each *AutoPurge System* to the *Purity Manifold* (tubing to be provided by the manufacturer).
4. AIR MAINTENANCE DEVICE (SUPPLIED BY THE INSTALLING CONTRACTOR)
	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.
	2. The Air Maintenance Device shall be the equivalent of an AMD-1 and not contain a pressure switch.
	3. The Air Maintenance Device shall be installed per the manufacturer’s specifications.
5. SYSTEM COMPLIANCES
	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:
		1. NFPA 13: Standard for Installation of Sprinkler Systems.
		2. NFPA 25: Standard for the Inspection, Testing and Maintenance of Water-Based Fire Protection Systems (FPS).
		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.
6. SYSTEM INSTALLATION PROTOCOL
	1. As specified by the Design Engineer, a South-Tek Systems Nitrogen Generation System which includes the integrated *BlastOff* Alarms 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 Purity Manifold)*, and all related accessories shall be installed by the Sprinkler Contractor and no party shall remove or tamper with the devices.
		1. The following shall be installed and/or completed during installation of the South-Tek Systems Nitrogen Generation Corrosion Inhibiting System:
			1. South-Tek Systems Nitrogen Generation System
			2. Related products (see 4.0 through 8.0)
			3. As required, all piping, fittings, valves, etc.
			4. System compliance and pressure (leak) testing
	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.
	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 per the manufacturer.
	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 2013 NFPA 13 requirements (24.2.2.1).
7. SYSTEM STARTUP AND INSTALLATION TRAINING
	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.
	2. Contact South-Tek Systems; 2940 Orville Wright Way, Suite 600, Wilmington, NC, 28405

 Phone: 910-332-4173 for further information.

1. WARRANTY
	1. All equipment provided by South-Tek Systems and manufactured by South-Tek Systems is to be warranted against defects for 12 months beginning upon the date of the system installation, which shall not exceed (2) months from the date in which the product is shipped from South-Tek Systems.