

MULTI-SECTOR AIR POLLUTANT REGULATION  
**MSAPR COMPLIANCE**

Are you ready?





# MSAPR: Road to Compliance

## Multi-Sector Air Pollutant Regulation (MSAPR) Part 2

With Phase 2 of the NOx emission limits for pre-existing engines under MSAPR coming into force on January 1, 2026, companies need to make a choice between two available compliance approaches:

### Option 1: Per-Engine

Under this compliance approach all regulated pre-existing engines are required to meet the NOx performance standard of 4 g/kWh output, or 210 ppmvd15%, and need testing within 12 months after the limit applies. All rich burn engines will need NOx controls implemented (Air-Fuel Ratio Controller and Catalyst Systems) prior to January 1, 2026, to ensure they do not exceed the NOx limit. Companies also need to establish if lean burn engines exceed the NOx limit under all operating conditions with changes in ambient temperature and load. If so, Air-Fuel Ratio Controller may need to be implemented to regulate performance.

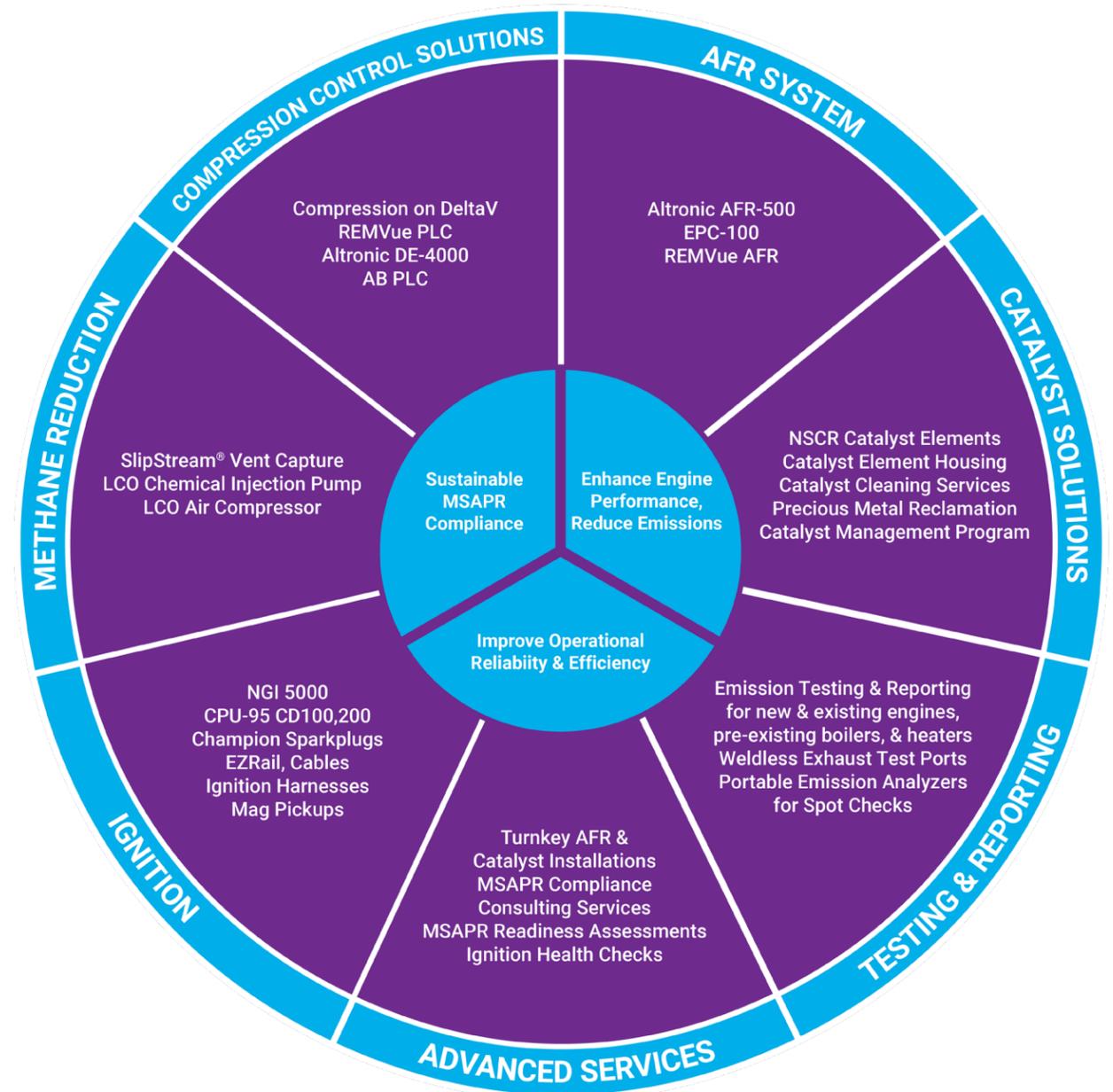
### Option 3: Subgroup (or Yearly Average)

Under this compliance approach, a yearly average limit of 4 g/kWh output or 210 ppmvd15% applies to a subgroup of engines within a company's engine group. Each individual engine is assigned a NOx emission limit called an "Emission Value," which, along with the rated brake power of the engine and the run-hours is used to calculate the fleet average NOx emissions. Performance tests must be conducted on engines with non-default emission values to determine that the engine is meeting its limit. The default for rich-burn engines is 24 g/kWh output or 1,262 ppmvd15%, and the default for lean-burn engines is 13.5 g/kWh output or 710 ppmvd15%.

Because the default Emission Values are so high with respect to the NOx limit, companies will need to assign non-default emissions values less than or equal to 4 g/kWh output or 210 ppmvd15% to most engines in their fleet to meet the yearly average. To do this, rich-burn engines will need NOx controls implemented (Air-Fuel Ratio Controller and Catalyst Systems), and the engine tested prior to January 1, 2026. The majority of lean-burn engines will also need to be tested prior to January 1, 2026 to establish a non-default Emission Value, and determine if an Air-Fuel Ratio Controller is required to regulate the engine's performance. NOx emissions must not exceed the assigned Emission Value under all operating conditions including changes in ambient temperature and load.

Navigating the path to compliance can be a challenging endeavor. At Spartan Controls and Signet, we offer a comprehensive suite of solutions, testing, and consulting services designed to simplify the journey and make it cost-effective.

# Sustainability, Solutions, and Service





# AFR Systems

Our advanced Air-Fuel Ratio (AFR) control systems optimize combustion efficiency to reduce NOx emissions and ensure compliance with MSAPR limits. Designed for reliability and ease of integration, our AFR solutions help operators meet regulatory requirements while improving fuel efficiency and engine performance.

**AFR 500**



- Available in single regulator (one AFR-500 module) and dual regulator configurations (two modules)
- 24 VDC-powered module designed for DIN-rail mounting in control panels or enclosures
- Suitable for new and retrofit installations
- Includes onboard temperature protection, analog/digital control inputs, and advanced setpoint mapping
- Employs modern UEGO (wide-band) exhaust sensor for precise air-fuel ratio control
- Handles substantial changes in engine load and fuel gas BTU levels with precision and speed

**AFR 500**



- Works seamlessly with Altronic EPC-series stepper motor-based valves, AGV-5 actuator, and other 4-20mA-compatible devices
- Available with standard 8" and 15" HMI displays via ACM-4000 Altronic Computing Module
- Full Ethernet and ModBus TCP compatibility for configuration and operation
- Accessible from a PC or similar device through an onboard Ethernet port
- Suitable for use in Class I, Division 2, Groups C and D hazardous areas



- Air-fuel ratio applications for rich and lean burn engine models
- Shutdown and advanced process control
- Full suite of Spartan advanced applications available i.e. SlipStream



**EPC-100**



- Suitable for most carbureted, natural gas-fueled engines
- EPC-110/120 and EPC-100E for stoichiometric engines with catalytic converters
- EPC-150 for carbureted, lean-burn engines
- Utilizes an exhaust-mounted oxygen sensor for feedback
- Maintains target oxygen levels for optimal emissions control
- Supports ModBus RTU protocol for supervisory system compatibility
- Certified by CSA for use in hazardous areas (Class I, Division 2, Groups C and D)

# Catalyst Solutions



We offer high-performance catalyst systems tailored for MSAPR compliance, effectively reducing NOx, CO, and VOC emissions. Our solutions include new catalyst elements, cleaning, and housing strategies to maximize service life and performance, ensuring your operations stay within regulatory thresholds.

## Catalyst Elements

- Catalyst elements for all sizes of engines
- Various options in performance and durability
- Western Canada's largest inventory of catalyst elements

## Catalyst Housing

- Stainless and carbon steel housing options available
- Optional silencers for noise reduction
- Made locally, which translates to lower shipping costs

## Catalyst Cleaning

- Western Canada's largest catalyst cleaning facility
- Non-intrusive cleaning process
- Fast turnaround
- Post testing performance report included
- Reclamation of catalyst elements' precious metal, if catalyst element cannot be returned to service



## Signet Catalyst Management Program



- ★ Extend the life of a catalyst element
- ★ Non-intrusive cleaning process which maintains integrity of the catalyst
- ★ Destruction efficiency test guaranteeing baseline performance
- ★ Precious metal recovery credit toward your next catalyst element purchase



# Reporting and Testing



## Ensuring regulatory compliance & environmental responsibility

At Signet, we specialize in providing a comprehensive range of emissions testing services to help Canadian oil and gas producers ensure regulatory compliance and meet their internal Environmental, Social, and Governance (ESG) disclosure goals.

Our team of experts possess mechanical expertise and extensive experience in engine tuning and balancing, enabling us to collaborate effectively with your maintenance staff to ensure that your engines meet emissions standards, while maintaining productivity, minimizing environmental impact, and complying with regulations.

### Exhaust Stack Emissions Testing & Program Management

Signet offers turnkey emissions testing and program management services utilizing experienced emissions testing technicians, CEMS grade testing equipment, and providing detailed testing reports.

**Call us today to review your engine fleet and create a testing plan that meets your requirements.**

## Compliance Assurance

- Advice on program management and compliance approach optimization
- Intimate knowledge of the regulation and the allowed testing methods
- Comprehensive compliance reports provided for each test
- Signet MSAPR compliance reports exclusively meet ECCC reporting criteria

## Customer Service

- Full-time planner/scheduler
- Technical support/problem diagnosis
- Compliance readiness assessments



## Regulatory & Specialized Testing

- CEMS grade testing equipment for key air contaminants and greenhouse gases
- Isokinetic Sampling Train
- Ability to handle natural gas engines, b-oilers and heaters, and turbines

## Experience & Expertise

- Extensive stack testing experience with thousands of regulatory tests completed to date
- Expertise to assist with engine tuning and problem diagnosis
- Capacity to handle all of your testing requirements



**COMPLIANCE TESTING**

- MSAPR part 1 - boilers & heaters
- MSAPR part 2 - stationary spark-ignition engines

**FACILITY PERMITS & LICENSE Approval Stack Testing Requirements**

- BC Energy Regulator (BCER) permits
- Environmental Protection & Enhancement Act (EPEA) approvals

**SPECIAL PROJECTS**

- Methane slip testing
- Isokinetic sampling

Our Spartan and Signet service and testing technicians are engine experts, that can monitor and tune your engine for performance and MSAPR compliance.



### Turnkey Solution

- Full turnkey installation available for AFR, catalyst housing and elements, access platform for testing and changing elements
- Option to provide I&E and mechanical if required

## MSAPR Compliance Consulting Services

### Customer Service

- Engine/Catalyst assembly experts
- Catalyst troubleshooting (on-site available)
- Catalyst maintenance - best practices & training
- Choice of new or replacement elements - Standard/Premium
- Technical Data Sheet can be provided

### Catalyst Lifecycle Optimization

- Manage your catalyst element inventory, from anywhere with our database
- Predictive maintenance & proactive measures to prevent downtime
- Catalyst element lifecycle tracking
- Regulatory emissions testing

Upgrading ignition systems is a key strategy for achieving consistent MSAPR compliance. Our precision ignition solutions enhance combustion stability, reduce emissions, and improve engine reliability—ensuring your equipment operates at peak efficiency while staying within regulated limits.



- Patented technology to support performance, combustion stability, diagnostics, and system access
- Unique, dual seven inch 1080p, user configurable, HD displays for system monitoring and control
- Simple system configuration and integration with other control systems
- Certified for use in Class I, Division 2, Group C, and D hazardous operation areas

### Champion® Industrial Spark Plugs

Champion® Industrial plugs are engineered to keep industrial equipment running strong. Designed with precious metals, F.I.S.S resistor technology and Hot Lock, our plugs are able to withstand today's high-temperature / high-load service environments. And since they're products of the global engineering and development of Federal-Mogul, they're built to live up to the Champion® name.



### Altronic EZRail System

- The Altronic EZRail system provides a factory-built, tested ignition wiring and coil mounting solution, eliminating costly custom on-site fabrication and associated maintenance issues
- Constructed with premium materials like anodized aluminum, stainless steel, and military-style connectors, the system ensures extended, trouble-free service



# Methane Reduction

Our Low Carbon Operation (LCO) solutions, including LCO injection pumps, air compressors, and SlipStream technology, effectively reduce methane emissions while improving fuel efficiency. SlipStream involves capturing and repurposing vented gas, while LCO solutions replace process gas with instrument air, and solar power to lower environmental impact and help operators meet stringent regulatory requirements while optimizing performance.

## Stand-Alone SS10

- Built-in PLC and I/O
- Ethernet communications
- Red Lion PLC platform
- Integrated I/O
- Pro-face HMI
- Optional engine communication
- Trending
- Internal data logging



## AB PLC



## AB PLC

- AB CompactLogix or ControlLogix PLC platform
- SlipStream integrated into main controller – PanelView Plus or Pro-face HMI
- All compressor and SlipStream information on one HMI



## REMVue-500

- Red Lion PLC platform
- SlipStream integrated into main controller – Pro-face HMI
- All compressor and SlipStream information on one HMI

# Electric Solution

## LCO Chemical Injection Pump



**CROSSFIRE pump precise chemical management reduce methane emissions and minimize chemical waste**

One electrical chemical pump (24 vdc) with four heads can replace up to four pneumatic chemical pumps.

- Runs off solar power - utilizes 6.6 Watts
- Smart/diagnostics/connectivity (SCADA/RTU)
- Zero methane emissions
- Carbon credit generator - Brownfield

## CROSSFIRE Air Receiver

- Options for 30-gallon and 60-gallon vertical air receivers
- 1,300 SCFD @ 35psi with 35psi, 50psi, or 100psi options available
- Integrated Rosemount 2088 Pressure Transmitter
- 200psi safety relief and 1/2" connection
- Custom designs available upon request

**The CROSSFIRE Platform is a complete ultra-low power environmental solution for methane emission reduction.**



# Compressor Control Solutions

As part of your MSAPR upgrade, many Engine operators also consider control panel upgrades to improve reliability and reduce operational costs. Spartan offers complete new panel replacements or retrofit backplates to fit existing cabinet enclosures.

Replace existing pneumatic, Amot Microguard, Flexiguard, and Murphy panels with complete Altronic, REMVue, AB PLC, and Compression on DeltaV Solutions.

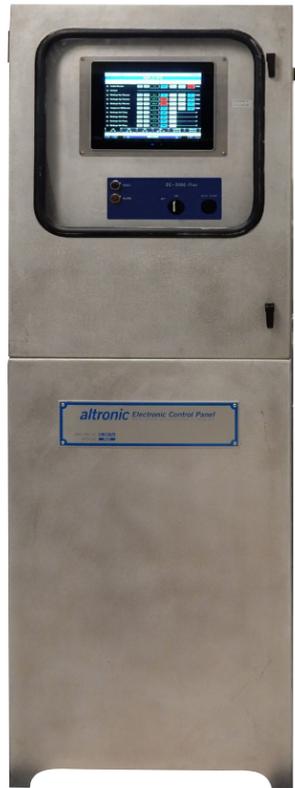
## ALTRONIC DE-3000

## ALTRONIC DE-4000

## REMVUE®

## AB PLC

## DELTA V™



- Configurable safety shutdown and control system
- Scalable IO capacity covering a wide range of applications
- C1D2 or C1D1 rated systems available
- Low power requirement
- Cost effective solution

- Modern configurable safety shutdown and control system
- Scalable I/O
- Configurable capacity control, sequencing timers, and autostart functionality

- Red Lion PLC platform
- Pro-face HMI
- Shutdown and advanced process control
- Full suite of Spartan advanced applications available i.e. SlipStream, AFR

- AB PLC, CompactLogix, ControlLogix, and MicroLogix PLC platform
- AB PanelView Plus or Pro-face HMI
- Shutdown and advanced process control
- Full suite of Spartan advanced applications available i.e. SlipStream, AFR etc.

- PK controller
- Native Plantwide integration
- Industrial PC HMI
- Shutdown and advanced process control
- Part of the One Plant™ architecture

## Retrofit Solutions



### Subplate Conversions

- Replace existing: Exacta, Murphy, Frick Quantum, Hawk-I, Prologic, Motiv, other PLC, and EMIT systems with updated Allen-Bradley, Altronic, or REMVue hardware
- Keeps existing instrumentation, wiring, and control cabinet, lowering overall project and installation costs and completion timeline
- Upgrade path to advanced solutions such as AFR, SlipStream, and diagnostics
- Standard sizes in stock for quick delivery

### Full Panel Retrofits

- Replace existing pneumatic, Amot Microguard, Flexiguard, and Murphy panels with complete AB PLC, Altronic, or REMVue control panels
- Keep selected existing electronic instruments and wiring
- Upgrade path to advanced REMVue solutions such as AFR, SlipStream and Diagnostics
- Standard sizes in stock for quick delivery



## Control Panels Unmatched Functionality & Flexibility

### Built in Functionality:

- Capacity control
- Suction valve control
- Blowdown and recycle valve control
- Louver control
- Ignition control
- Lube and dump valve control
- Full range of start/stop/control sequencing
- Custom loading logic
- Data logging
- Remote start/load
- Engine/motor communications interfacing
- Hot start systems

## Spartan Controls Project Execution and Customer Support

- Program update support, program and document updates
- Updates thoroughly tested on simulators, not the customer's equipment
- Remote monitoring, remote FAT
- Program and CAD drawing historical archiving
- Vast installed base
- Standardized detailed project documentation – print and digital copy
  - Control narrative / operations manuals
  - I/O list / cause & effect
  - Communications map
  - Engineered stamped panel drawings, complete with heat and power calculations

# Cabinet Design Examples

## Cabinet Design

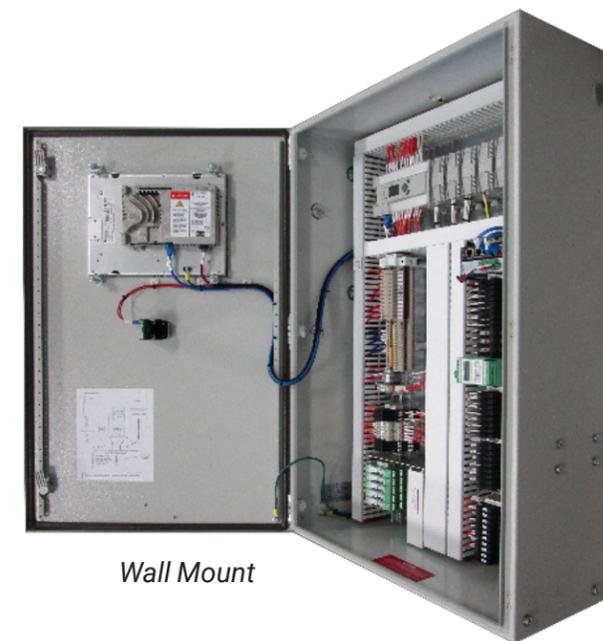
- Clean separation of pneumatic and electronic components
- Open access to instrumentation
- Option to mount instrumentation on panel or skid
- Cutouts for future pneumatic components
- Space for electrical entry
- Designed for expansion
- Segregation of I/O wiring



*Optional instruments  
with bulkhead*



*Nema 4X*

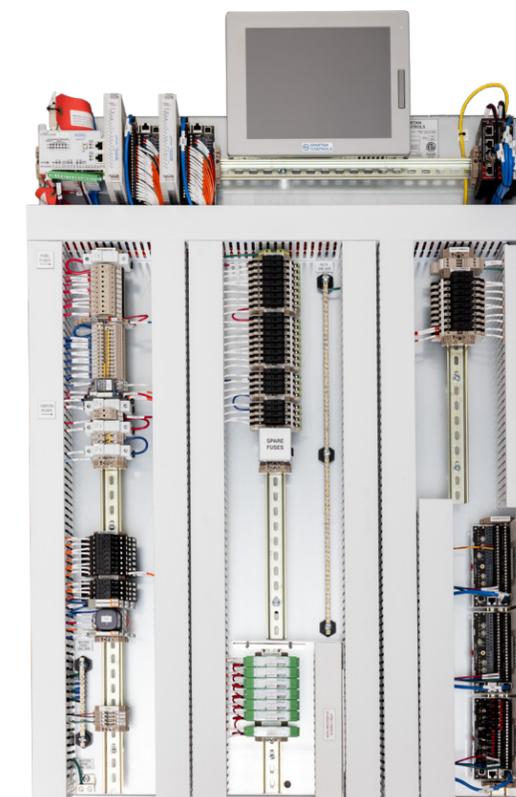
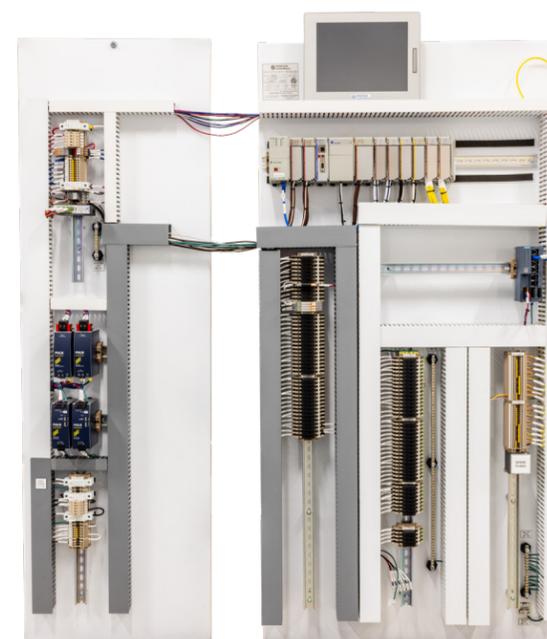


*Wall Mount*

## Custom Designs



- Indoor / Outdoor
- Heating and cooling options
- Nema 4, 4X
- Instrument racks



*Subplate: installs into existing enclosure*



# MSAPR COMPLIANCE

We are ready to help

At Spartan Controls we are ready to assist you with your MSAPR compliance requirements. Whether it is AFR solutions, catalyst elements, housings, readiness assessments, compliance testing and reporting, catalyst cleaning, and more, we have you covered.

---

---

Call us or request a quote online 24/7

+1 (877)278-6404 | [MSAPRsolutions@spartancontrols.com](mailto:MSAPRsolutions@spartancontrols.com)

