

# MVS SP4<sup>®</sup> COATING

MUSTANG VACUUM SYSTEMS, INC.



# SP4® COATING BY MUSTANG VACUUM SYSTEMS, INC.

## OBJECTIVE:

- Reduce friction and improve wear resistance of modern machinery to create great economical significance, in terms of long-term reliability, maintenance and wear.
- The tribological conditions of the parts can be improved by surface treatments.
- Thin film coating developed by MVS provides excellent mechanical, electrical and thermal properties.



## TARGETED MARKET:

### Automotive



### Medical



### Firearms



### Oil and gas



- MVS proprietary coating, called as SP4 coating creates a surface that,
  - (a) lowers friction
  - (b) increases reliability
  - (c) Improves load capacity
  - (d) lowers lifecycle part cost

## SUCCESS FACTORS:

- SP4 coating provided by MVS can be applied to parts of various size and geometry. SP4 coating has been race proven to perform significantly better than uncoated part.
- Some of the coating characteristics are listed below,
  - Hardness: 2000 – 3000 HV (variable with process)
  - Thickness: 1 – 8  $\mu\text{m}$
  - Co-efficient of Friction: 0.05 – 0.08
  - Elastic modulus: 180 – 220 GPa
  - Temperature: 350°C
  - Biocompatible: Non-toxic, non-cytotoxic
  - Salinity: 96 hours under modified salt spray
  - Fouling: Resistant to biofouling

## KEY PERFORMANCE INDICATORS:

1. Automotive sector – Low friction, wear/heat resistant
2. Medical devices – High lubricity (non-stick), biocompatible
3. Oil and gas – Good corrosion resistance in harsh environment, Wear resistant
4. Oceanography – Anti-biofouling and anti-scaling, hydrophobic
5. Firearms - Longer product lifespan (BCG), High hardness, high wear resistance, very high lubricity in a thin film technology.

## CONTACT INFORMATION:

Mustang Vacuum Systems, Inc.  
7135 16<sup>th</sup> Street East, Sarasota, FL 34243  
Ph: 941-377-1440  
[www.mustangvac.com](http://www.mustangvac.com)



# SP4 FOR AUTOMOTIVE COMPONENTS/ PERFORMANCE RACING

## OBJECTIVE:

- The main constituents that affect the engine performance are, (a) friction, (b) corrosion and (c) heat.
- Stainless steel components in the engine such as wristpins, valves are prone to galling and causes significant wear to the parts.
- The tribological conditions of the parts can be improved by surface treatments.
- Thin film DLC coatings provides low wear, friction and improve fuel efficiency, thereby positively impacting the economy.

## TARGETED MARKET:

Automotive manufacturers and performance racing industry

MVS proprietary DLC coating, called as SP4 coating creates a surface that,

- (a) lowers friction
- (b) increases reliability
- (c) Improves load capacity
- (d) lowers part cost



## SUCCESS FACTORS:

- SP4 coating increases the horse power of the engine.
- Even a 0.25mile increase in mileage shows significant reduction in financial burden on the truck fleets.
- One set of SP4 coated wristpin can stand at least five races in performance racing, whereas uncoated pins had to be replaced in every race.
- SP4 coated gears minimize the friction, thereby reducing the use of lubricants.
- SP4 coated crankshaft saw a gain of 7 – 9 HP in NASCAR engines and 11-13 HP gain in NHRA engines.

## KEY PERFORMANCE INDICATORS:

- Race proven and longevity tested
- Improved fuel efficiency
- Increase the longevity of the wristpin and pin bore
- Negligible loss of valve material
- Enhanced performance with lubricant free gears.



## CONTACT INFORMATION:

Mustang Vacuum Systems, Inc.  
7135 16<sup>th</sup> Street East, Sarasota, FL 34243  
Ph: 941-377-1440  
[www.mustangvac.com](http://www.mustangvac.com)



# SP4 FOR OCEANOGRAPHY

## OBJECTIVE:

- Biofouling of ship hulls and any underwater saline exposed metal poses a significant impediment to ship performance.
- This increases the drag and in-turn increases the fuel consumption.
- Typically, anti-fouling paint is applied, which could be environmentally hazardous.
- Alternate techniques such as sharklet and Zwitterion are not cost-effective when scaled-up.
- Thin film SP4 coating can provide a low- friction, corrosion free layer, which is highly economical too.

## SUCCESS FACTORS:

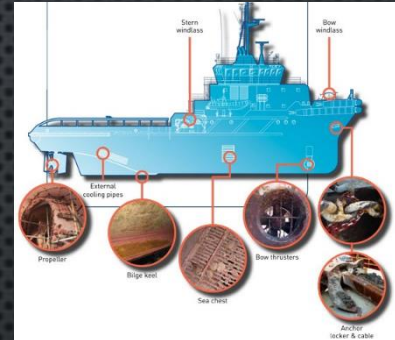
- SP4 coating reduces the drag by not letting bio-matter grow on the surface.
- SP4 coating is highly wear resistant and has proven to withstand over 2000hrs of corrosion resistance.
- The coating has high surface energy facilitating a slippery surface such that barnacles cannot adhere to the surface.
- This enables the underwater vehicle to perform with lesser fuel.

## TARGETED USER: US Navy, Commercial and recreational vessels

Typically, a ship can add barnacle weight at 150 kgs per square meter in as little as six months. This reduces the vessel speed up to 10 percent from biofouling, requiring up to a 40 percent increase in fuel consumption.

SP4 coating creates a surface that,

- (a) lowers friction
- (b) increases reliability
- (c) Improves load capacity
- (d) lowers part cost



## KEY PERFORMANCE INDICATORS:

- Race proven and longevity tested
- Improved fuel efficiency
- Increase the longevity of the ship hull or any other surface exposed to saline environment
- Negligible loss of coated material
- Enhanced performance with no change to the existing vessel design.

## CONTACT INFORMATION:

Mustang Vacuum Systems, Inc.  
7135 16<sup>th</sup> Street East, Sarasota, FL 34243  
Ph: 941-377-1440  
[www.mustangvac.com](http://www.mustangvac.com)



# SP4 COATING FOR OIL AND GAS INDUSTRY

## OBJECTIVE:

- Corrosion is one the outstanding challenge faced by the oil and gas sector., costing billions of dollars.
- Typical mitigation techniques involve surface coatings such as, thermal spray, electrodeposition, and diffusion coatings.
- Currently, thin film coatings are proving to be highly efficient in preventing corrosion, wear etc.
- Thin film coating developed by MVS provides a low- friction, wear and corrosion resistant layer.

## TARGETED USER: Oil and gas exploration industry

- MVS SP4 coating creates a surface that,
- (a) lowers friction
  - (b) provides significant corrosion resistance
  - (c) increases reliability
  - (d) reduces fouling
  - (e) lowers maintenance cost



## SUCCESS FACTORS:

- Considering the success of MVS SP4 coating for automotive applications – specifically for NASCAR, the thin film coating has proven to last long with high reliability.
- SP4 coating is highly wear resistant and has proven to withstand over 2000 hrs in a corrosive environment.
- The coating has high surface energy facilitating a slippery surface such that foreign materials cannot adhere to the surface.

## KEY PERFORMANCE INDICATORS:

- Increase the longevity of surface exposed to corrosive environment
- Negligible loss of coated material
- Enhanced performance with no change to the existing design.

## CONTACT INFORMATION:

Mustang Vacuum Systems, Inc.  
7135 16<sup>th</sup> Street East, Sarasota, FL 34243  
Ph: 941-377-1440  
[www.mustangvac.com](http://www.mustangvac.com)