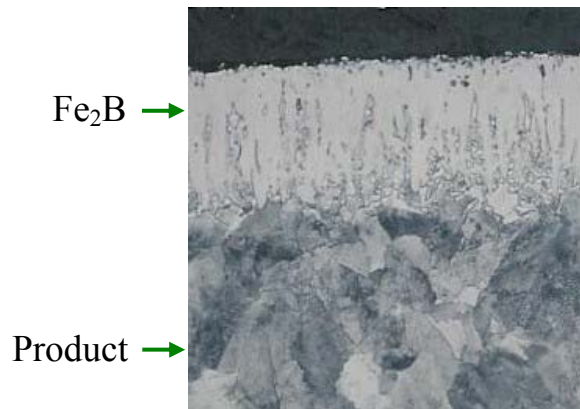


## **HARD KOTE®**

### *Competitive Advantage through reduced Abrasion, Corrosion, & Erosion costs*

**HARD KOTE®** is our proprietary process wherein a boron based powder chemically reacts with the steel surface, creating a new extremely hard compound known as Fe<sub>2</sub>B or Iron Boride. This new compound grows into and becomes part of the steel, giving it excellent resistance to spalling or flaking. It can penetrate up to 80% into the surface of the product, and in doing so creates a tooth like structure as shown in photo below.



The end result is an extremely hard surface that can reduce abrasion, corrosion, and erosion of the part. Not to mention that the surface has a low coefficient of friction allowing higher flow rates.

This process can be applied to various different alloys some of which include:

- Carbon steels
- Alloy steels
- Stainless steels
- Tool steels
- Ni-Resist

It can also be selectively applied to different areas of parts or even on parts that have a complex geometry, or small ports that require coating.

# HARD KOTE®

## Benefits

The benefits to using **HARD KOTE®** treated materials:

1. Provides excellent abrasion resistance, and sliding wear
2. Significant corrosion resistance in acidic environments.
3. Low coefficient of friction
4. Minimal dimensional change from original tolerances.
5. Uniform thickness can be maintained on irregular shapes.
6. Coating is predictable and repeatable for given materials.

**HARD KOTE®** will make your product last longer in an abrasive, corrosive, or erosive environment. We want to help your company grow, give us a call at 1-800-265-8665 and we would be glad to help!

## Applications

**HARD KOTE®** is perfect for any application which is subject to a combination of abrasion, adhesion, corrosion, or erosion. This process has been used successfully in industries such as:

- Oil & Gas
- Mining
- Manufacturing
- Agriculture
- Power Generation
- Pulp & Paper

## Hardness and depth chart

<i>Material Type</i>	<i>Coating Thickness (inch)</i>	<i>Vickers Hardness (HV)</i>
Carbon Steel	0.002 to 0.006	1500 to 2500
Alloy Steel	0.002 to 0.006	1500 to 2500
Tool Steel	0.002 to 0.006	1500 to 3000
Stainless Steel	0.0005 to 0.0015	1100 to 2000
Ni-Resist Cast Steel	0.0003 to 0.0015	850 to 1500

Paintearth Energy Services Inc.

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Calgary, Alberta T2E 8K8

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Fax 403-258-2614

# HARD KOTE®

## Features

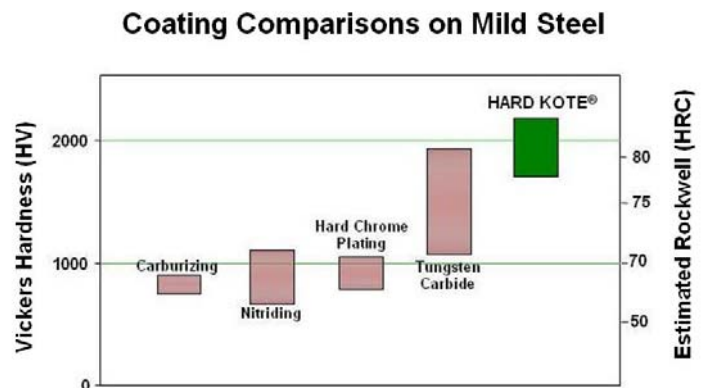
There are several advantages in using **HARD KOTE®** over other coatings in the industry. Other commercial coatings do offer some of the advantages listed below. However, only **HARD KOTE®** can offer all of them, consider it one stop shopping.

What is it worth to you to extend product service life by 10 times? Add up rig and labour costs, and lost production, reduce these by a factor of 10 and it won't take long to realize the savings!

1. High hardness is achieved, **HARD KOTE®** hardness greater than 80 HRC

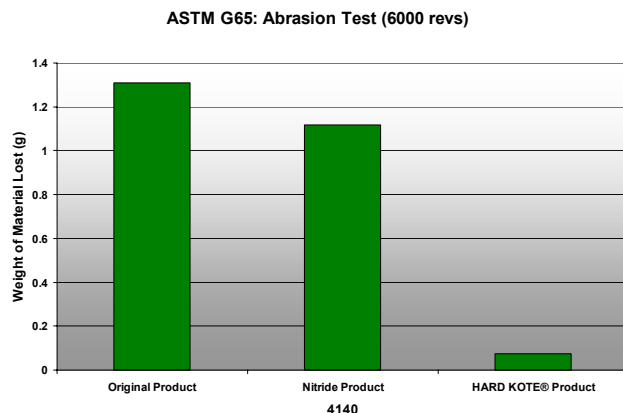
This high hardness aids in abrasion and erosion resistance upon impact or from fluid cutting.

**HARD KOTE®** has twice the hardness over other diffusion processes.



2. Excellent abrasion resistance, **HARD KOTE®** extends product life.

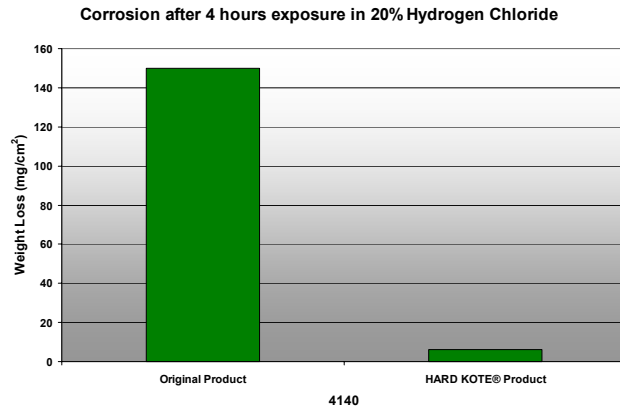
Test shows that the **HARD KOTE®** product has less wear over the original product. In fact it is 17 times better, what is it worth to you?



# HARD KOTE®

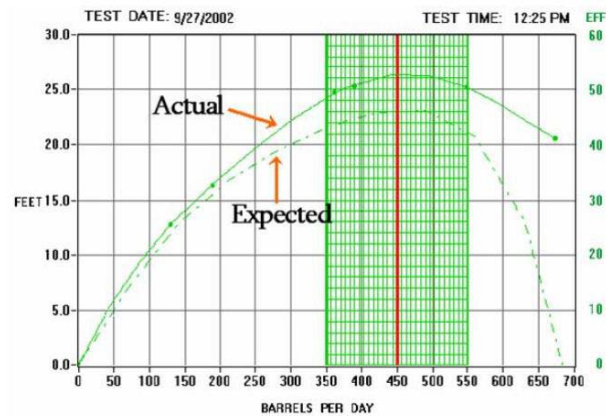
### 3. A corrosion resistant coating, **HARD KOTE®** stands up to various acids.

The original product shown in the chart has lost 25 times more material when compared to **HARD KOTE®** product under same conditions, also stands up against Sulfuric, and Phosphoric.



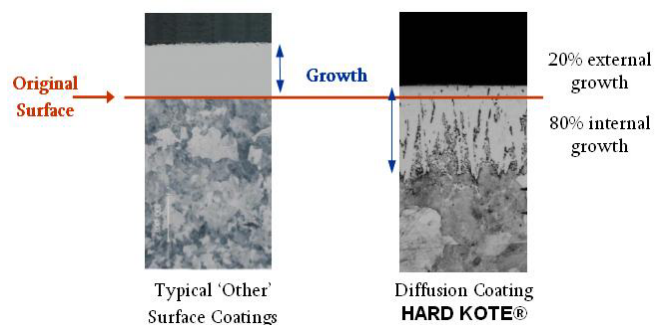
### 4. Improved flow rates, **HARD KOTE®** can improve fluid movement.

Improving fluid movement also aids in improving erosion resistance of the boron layer and of the part itself. External testing has shown a **10 to 20% increase** in flow rates over original product under same test conditions.



### 5. Retaining original dimensional tolerances is important.

**HARD KOTE®** diffuses into the product up to 80% of the total coating depth, allowing the consumer to protect their product and minimize the rework time of their part. The only exception to this rule is for castings, due to their internal stresses.



## HARD KOTE®

### 6. Where uniform application of a wear resistant coating is your concern

**HARD KOTE®** can be applied uniformly to a product beyond the line of sight, allowing complex geometry parts that have small ports or areas that cannot be reached by spray to be coated. There are no missed areas or overlapping of coatings. Paintearth utilizes computer run furnaces and industry proven powders to achieve this uniform coating.

### Longer Life = Lower Costs = More Profit

It's all about giving the customer the best advantage possible; a longer lasting product, and offering the best customer service possible. Please call us at 1-800-265-8665, and we would be glad to help.

### Case Study



Original part after one run

The above image shows excessive wear and erosion from the drilling fluid eroding and abrading the face of the part. This part is **not acceptable** to run again.



**HARD KOTE®** part after six runs and counting

The above image shows the reduced wear and erosion of the part. Notice that the part does not have any cracking or scarring of the face. This part is **still acceptable** to run again.