SG Powdered Metal Drills

Features of SG-Drill

Powder Metal with a TiCN Based Multi-Layered Coating

End Mill Shank for High Precision Drilling

- **Features:**
- **High Accuracy 3 Rake Relief (SG-ESS)**
- **2 Rake + X-Thinning (SG-ES)**
- **Premium Powder Metal with Composite Multi-Layer SG-Coating (TiCN)**
- **End Mill Shank for Highly Precise and Accurate Drilling**
- **General Purpose Drill for Wide Variety of Materials**
- **Comparable Performance to Carbide in Alloy Steel, Carbon Steel & Aluminum**
- **Suitable Work Materials:**
- **Structural Steels, Carbon Steels, Alloy Steels, Stainless Steels, Aluminum Alloys, Copper Alloys, Titanium, High Temp. Alloys**
- **Unsuitable Work Materials:**
- **300-Series Stainless (Use SG-ESR Jobber Drill)**
- **SG-ES (ES= Except Stainless)**

Features of New SG-ESR Drill

Powder Metal with a TiCN Based Multi-Layered Coating

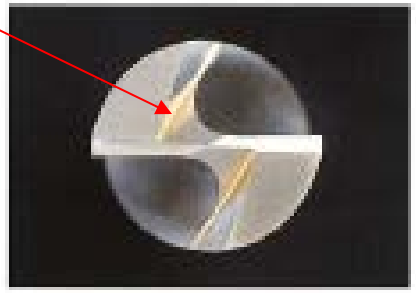
- **Features:**
- **Designed & Engineered for Hi-temp Alloys like Inconel & Titanium**
- **4-facet self centering point**
- **(Premium Powder Metal with Composite Multi-Layer SG-Coating (TiCN)**
- **End Mill Shank for Highly Precise and Accurate Drilling**
- **135° Self-Centering Point**
- **30-40% Cheaper than Carbide**
- **Suitable Work Materials:**
- **Structural Steels, Carbon Steels, Alloy Steels, Stainless Steels, Aluminum Alloys, Copper Alloys, Titanium, High Temp. Alloys**

End Mill Shank for High Precision Drilling

Point Geometry & Coating

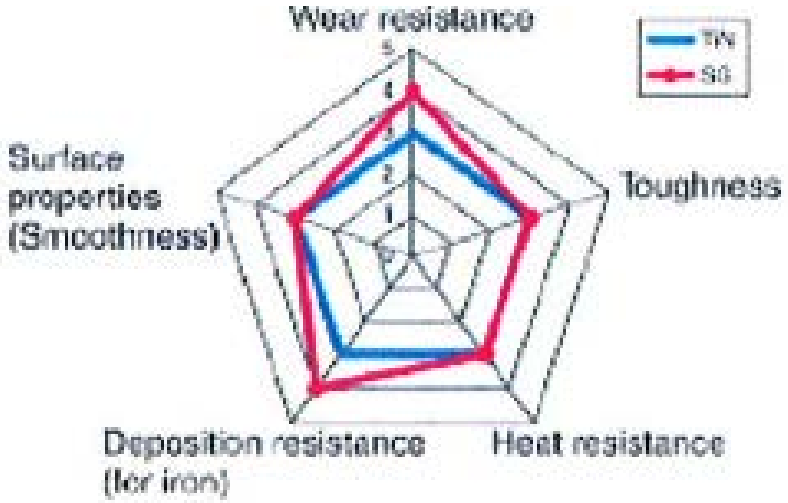
■(3- Rake Thinning)

SG-ESS Drill Point
(Stub Length)
Self Centering Point

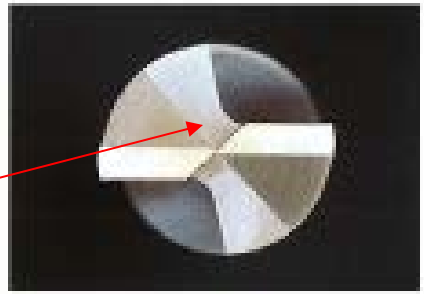


Characteristics of SG Coating:

Composite Multi-Layer Film Coating Method Characterized by Improved Wear Resistance as Compared to TiN.



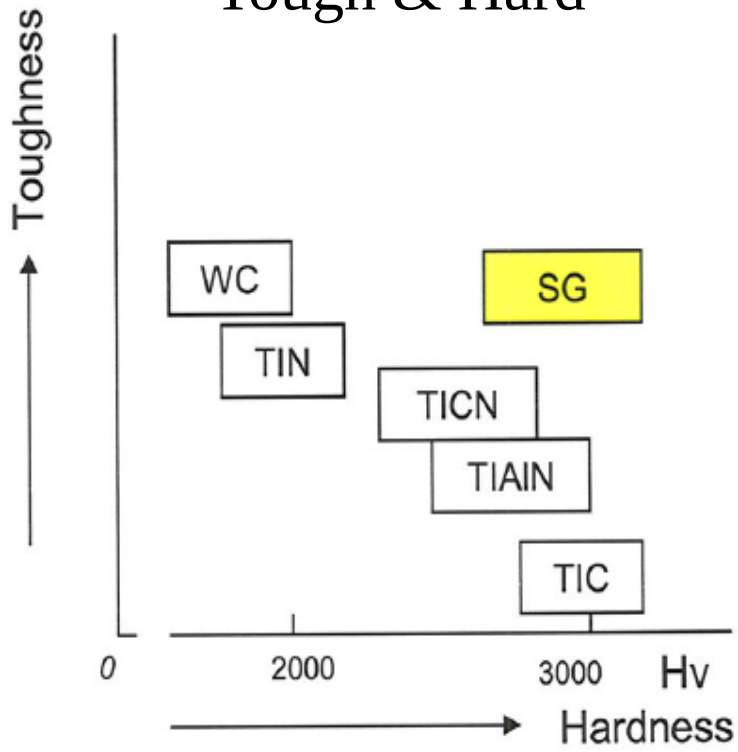
SG-ESR Drill
(Jobber's Length)



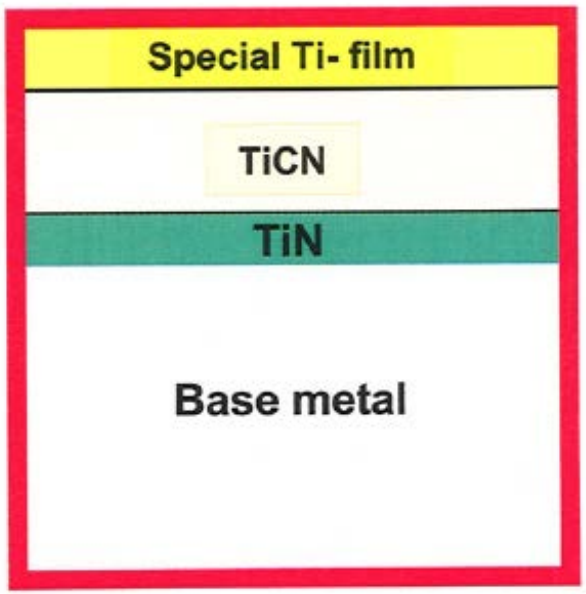
■(2- Rake + X- Thinning)

Features of SG-Coating

SG-Coating Both Tough & Hard



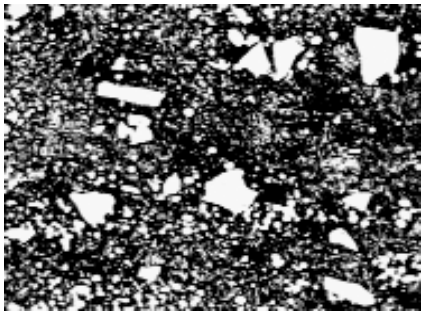
Micro Structure of the SG-Coating



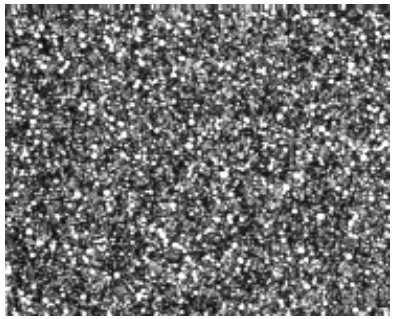
Material Character of PM-HSS

- **Wear Resistance of PM-HSS is Superior to HSS-CO**
- **Uniform Grain Size Results in Better Distribution and Dissipation of Heat**

Conventional HSS



PM-HSS

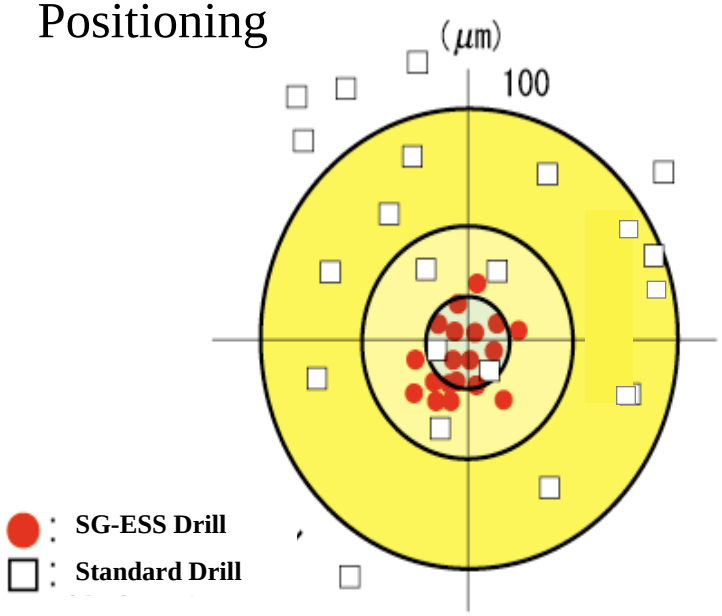


Uniform Grain Size

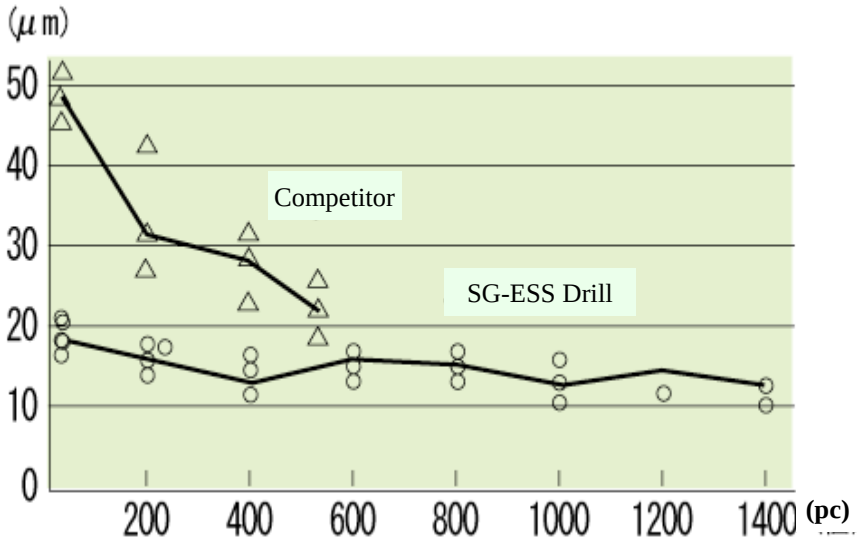
Performance of SG-ESS/ES

Extremely Precise Due to End Mill Shank and Flute Geometry

Positioning



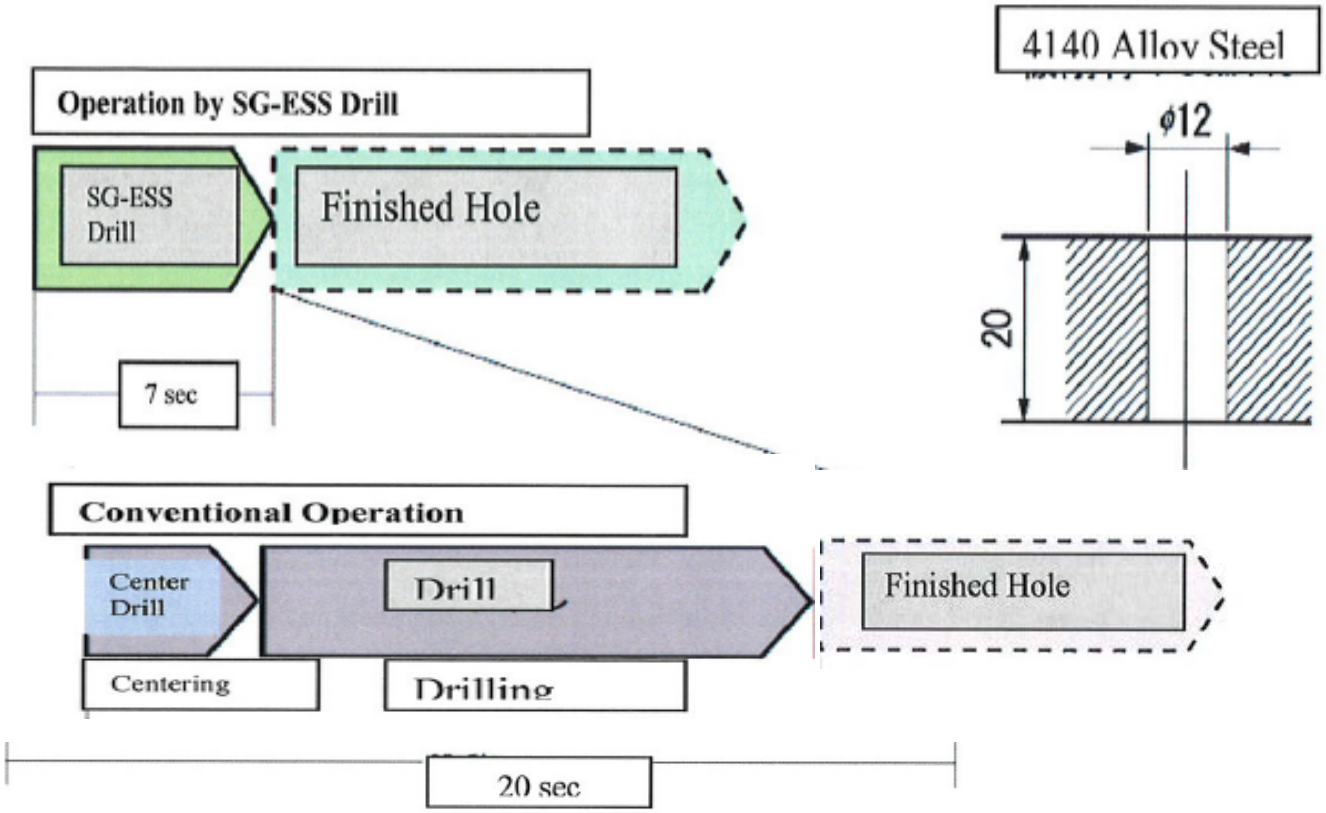
Hole Over Size



No. of Drilled Holes

SG-ESS Drills

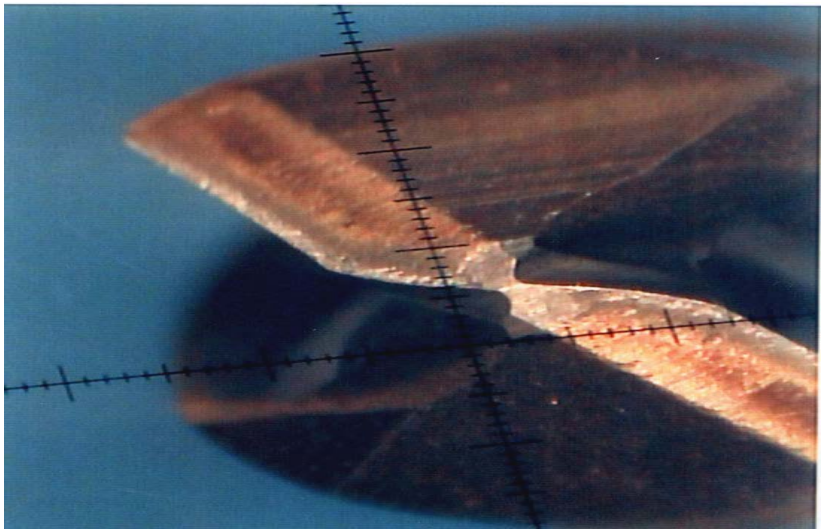
- **Eliminate the Center Drill Operation with SG-ESS Drills**
- **Precise Positioning & Reduced Drilling Cycle Time**



OSG Ex-Gold vs. SG-ESS

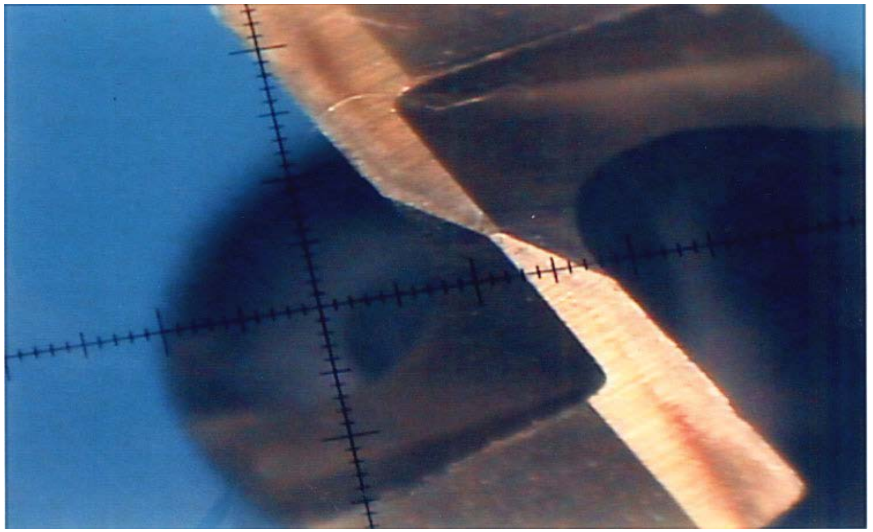
High Speed Drilling in 304 Stainless

OSG



OSG EX-Gold after 100 Holes

Nachi

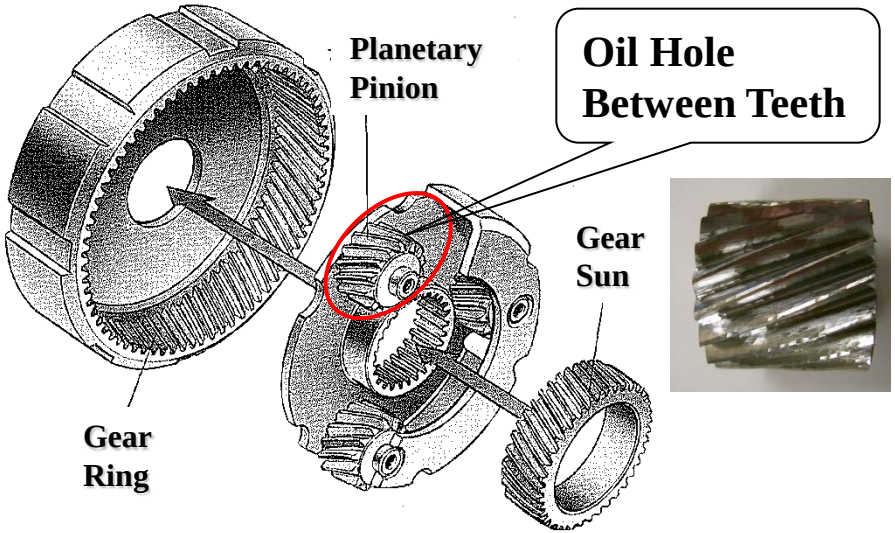


SG-ESS after 100 Holes

Summary

- **Nachi List 7573P Drills can be Reground for Continual Performance**
- **Superior Position and Accuracy is Attained with the Three-Rake Point and End Mill Shank Design**

Application Example「SG-ESS Drill」for Oil Hole of Pinion Gear



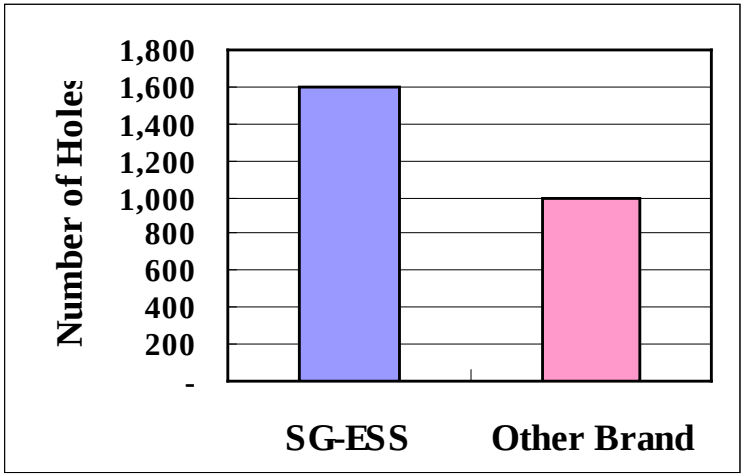
Drill： SG-ESS φ3.05
Depth：8mm Through
Conditions
RPM：1250 (SFM=105)
Feed： .005 IPR Or 6 IPM
Special Machine (Eguro)
Emulsion, Carbon Steel
Competitor: TiCN-PMHSS Drill (VP-GDS)

Tool Life:

1.6 Times Longer than the Current Drill
（1,000 Holes→1,600 Holes）

Price Difference:

15% Lower Price than Competitor



Application Example「SG-ESS Drill」for Oil Hole of Input Shaft

Drill： SG-ESSφ3
Depth：6mm Through
Conditions
RPM：2200（SFM=135）
Feed： .0035 IPR or 7.5 IPM
Horizontal Machining Center ZH624 (NACHI)
Emulsion, Carbon Steel
Competitor：TiN-HSS Drill (EX-GDS)

Tool Life
1.5 Times Longer than the Current Drill
（1,200 Holes→1,800 Holes）
Another Application in the Same Work Piece
Change the Current TiN-HSS Drill to SG-ESS4.0 for φ4mm Oil Hole
（500 Holes→750 Holes = also 1.5 Times Longer Tool Life）
Total Cost Down: 35% Saving

Successful Application Result

Customer: **Aerospace**

L7573P: SG-ESS Drill

- **Size = 1/4”**

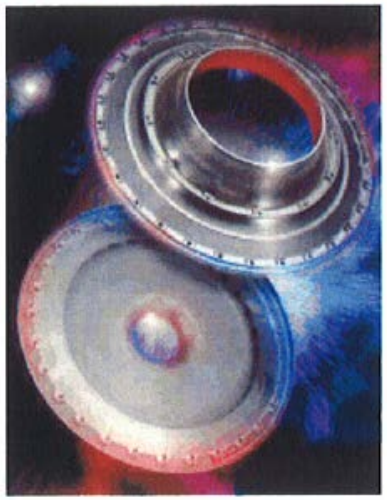
Cutting condition

- **Speed: 450 RPM (30 SFM)**
- **Feed: .004 IPR (1.8 IPM)**
- **Flood Coolant**
- **Material: Inconel 645**
- **Tool: 30 Holes**
- **Usage: 50 Pieces/Month**

Note

- **Replaced TiAlN Coated Carbide Drills**
- **Customer Cost Savings 40% and Double Tool Life Switching to Nachi SG-ESS Drills**

Shrouds & Diffuser Assemblies



Successful Application Result

Customer: **Oil Industry**

L7573P: SG-ESS Drill

- **Size = 3/8”**

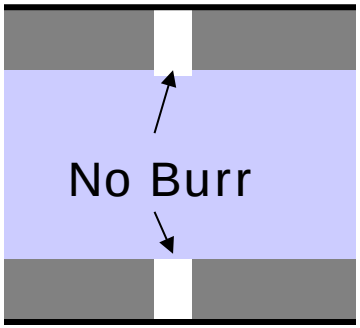
Cutting Condition

- **Speed: 900 RPM (95 SFM)**
- **Feed: .011 IPR (10.5 IPM)**
- **Flood Coolant**
- **Material: Low Carbon Steel**
- **Usage: 100 Pieces/Month**

Note

- **Eliminated De-Burring Operation Completely Resulting in Huge Savings on Cycle Time and Manpower for Customer**

Oil Tubing



SG- Drill Selling Points

- 30-50% Less Expensive than Carbide
- Double Speeds and Feeds than Conventional HSS-Co Drills
- Similar to Carbide Speeds and Feeds in Alloy Steel, Carbon Steel, Aluminum
- Equivalent to OSG Ex-Gold Drill
- Comparable Performance to Carbide in Alloy Steel, Carbon Steel, Aluminum
- Forgiving Power of HSS-Co Drills; Great for use on Machines with RPM Restrictions
- Consistent Tool Life
- End Mill Shank Provides Better Hole Tolerance and Stable Positioning Within 15µm
- SG-ESS & ESR Drills can be Used in wide Variety of Materials

OSG EX-Gold v/s Nachi SG-ESS

OSG EX-Gold:

- HSS-Co Drill
- TiN Coated
- 2-Rake+X Point (Non-Self Centering)
- 5-10% More Expensive than Nachi SG-ESS Drill.

NACHI SG-ESS Drill:

- Powder Metal Drill
- TiN + TiCN Coated (Dual Coating)
- 3 Rake Self-Centering Point Geometry
- 5-10% Cheaper than OSG Ex-Gold

•SG-ESS Drill is Better Product than OSG Ex-Gold Drill: Better Material, Coating, Geometry & Price.

Thank You