SG Powdered Metal Drills
Features of SG-Drill

Powder Metal with a TiCN Based Multi-Layered Coating

- **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)

End Mill Shank for High Precision Drilling
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-Layered 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)

Characteristics of SG Coating:

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

- (2- Rake + X- Thinning)

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

SG-ESR Drill (Jobber’s Length)
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

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
**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

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

Price Difference:
15% Lower Price than Competitor

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)
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
Successful Application Result

Customer: Oil Industry

L7573P: SG-ESS Drill
• Size = 3/8”

Cutting Condition
• Speed: 900 RPM (95 SFM)
• Feed: 0.011 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
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
