DLC Coated Piston Ring for Diesel Engine

With Daewoo Heavy Industry Co., Ltd.
1995
Schematic of Diesel Engine

**Required Properties of Top Ring**

- Anti-scuffing
- Wear Resistance
- Low Friction Coefficient
- Chemical Stability
- Self Lubrication
- Low Cost
Deposition Method

- 250KHz PACVD using CH$_4$
- Cylinder Coating Technology (analogy to VCR Head Drums)
- Buffer Layer Design for Optimum Adhesion

Coating of up to 10µm Thick Films
Reciprocal Tribometer (Plint 77)

sliding direction

piston ring

cylinder liner
(boron cast iron)
Anti-scuffing Property of Piston Rings

Test condition:
load: 200N, marginal lub. condition
Results of Wear Test under Dry Lubrication Conditions

![Graph showing friction coefficient vs number of cycles for different materials under no-lubricant condition with a load of 50N.](image-url)

- Hard Cr Ring
- DLC coated Ring

- No-lubricant condition
- Load 50N
Result of Dynamo Test (900h)

Hard Cr Coated Ring  
Before Test  
After Test

DLC coated Ring  
Before Test  
After test
**Hard Cr Coated Piston Ring**

Before Test

After Test

100µm

**DLC/Cr Coated Piston Ring**

Before Test

After Test

6.5µm

5.3µm