

Partner & Branch Office  
in Saudi Arabia



Korea Hidden Champion

# KST Plant

**Specialized in surface-treated high performance products**

Parts for power generation (Chute Liners, high temperature and high pressure valves, pump impellers, ash sludging line parts, etc.)

Equipment for marine plants (Ball valves, parts for pipes, etc.)

Corrosion and abrasion resistant ball valves for chemical plants.

# KST Plant Valve Features

Strong Corrosion,  
Chemical Resistance

Zero “0” Leakage

Strong Abrasion Resistanc

Low Torque

## Applied Technologies

KCC (KST Chromized Carbide)  
&  
KNN (KST Nano Nitriding)

## Applied Technologies

Superb Precise Machining  
0.005mm (Ball Tolerance)  
KST Specialized Design  
Low Coefficient of Friction – 0.2

## CERTIFICATION



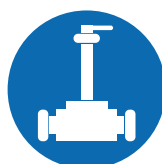




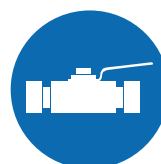
## OUR MAJOR PRODUCTS



METAL SEATED  
BALL VALVES



CRYOGENIC METAL  
SEATED BALL VALVE



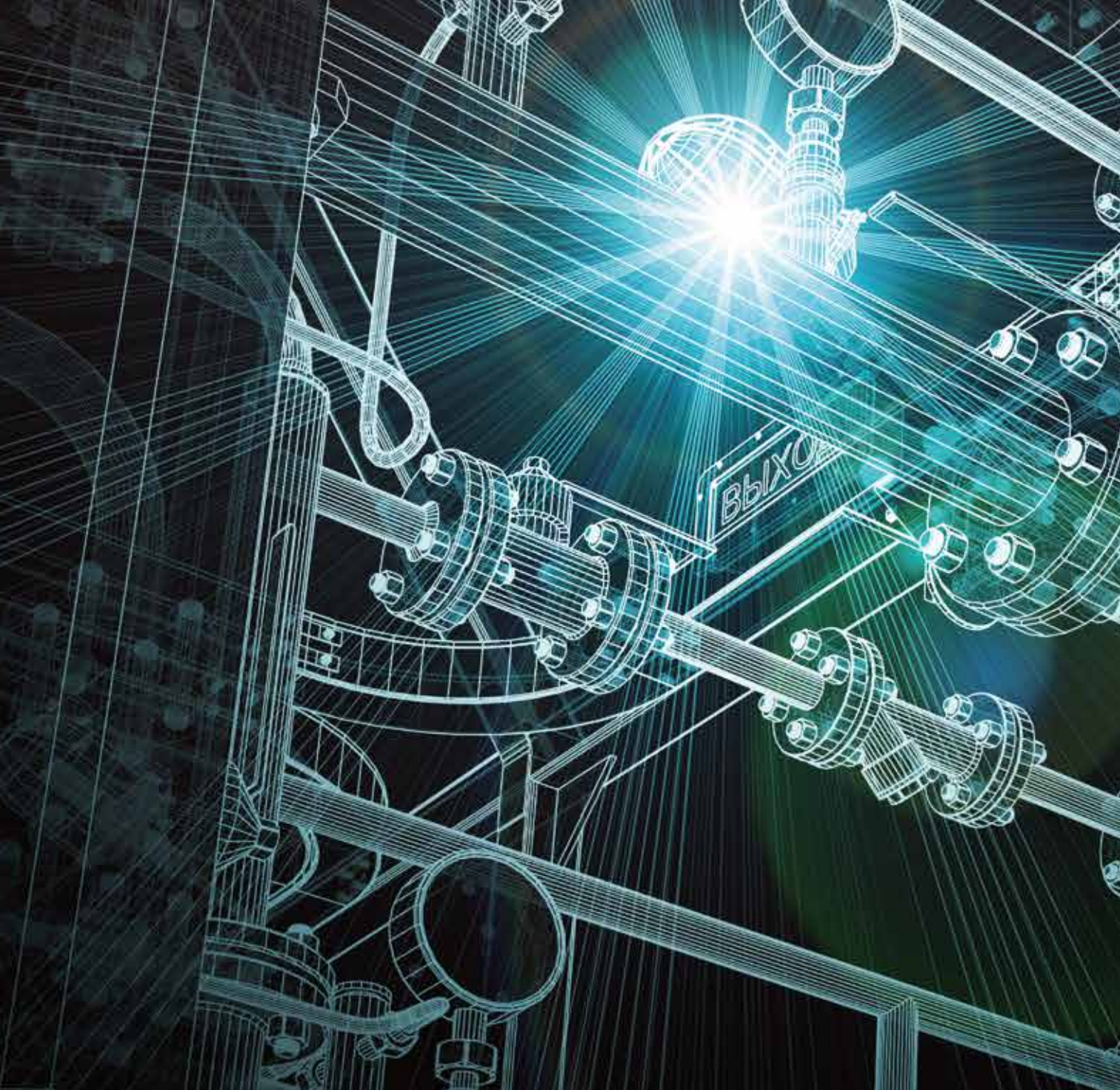
SEMICONDUCTOR  
VALVE & FITTINGS

## KST'S TECHNOLOGY

Specialized in surface-treated high performance products  
(Hybrid technology with KCC surface treatment and KNN-nano plasma technology)

- ✓ Stable at high temperature (750°C)
- ✓ Enhanced properties such as abrasion, corrosion, and chemical resistance
- ✓ High hardness (Hv 1500 ↑), low friction coefficient
- ✓ Excellent surface roughness → No post treatment process
- ✓ Controllable hardness and hardening depth of treated parts

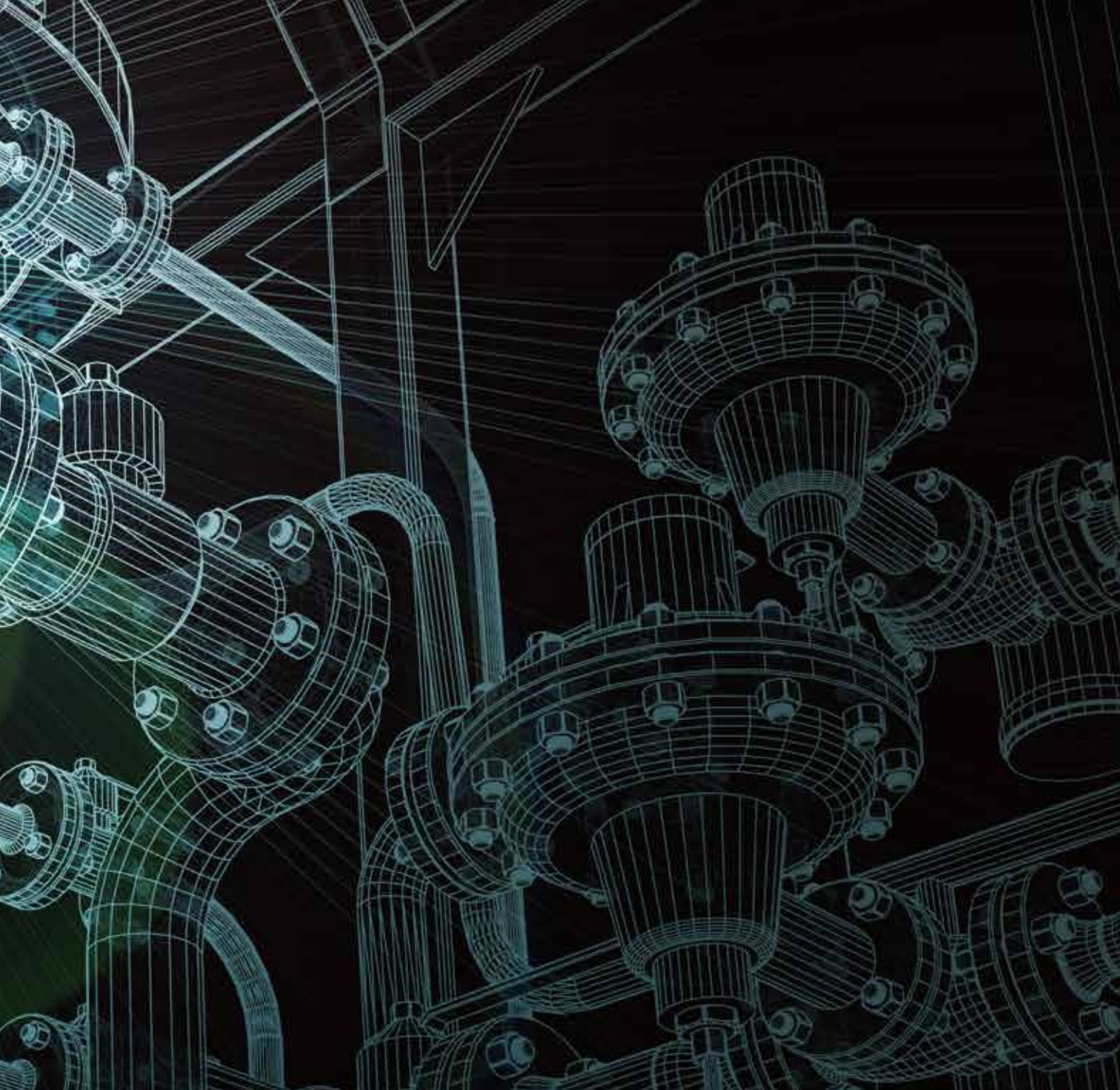




## **KST PLANT'S MAJOR CUSTOMERS**

All products of KST Plant had recognized from 5 major thermal power plants, POSCO and DSME(Daewoo Shipbuilding & Marine Engineering Construction Co., Ltd) included Semi Conductor manufacturers, SK Hynix, Samsung Electronics and LG Electronics in Korea





**DSME**  
DAEWOO SHIPBUILDING & MARINE  
ENGINEERING CONSTRUCTION CO., LTD.

posco



KOREA SOUTHERN POWER CO., LTD.

**KOEN**

KOREA SOUTH-EAST POWER CO., LTD.



KOREA WESTERN POWER CO., LTD.



**Aramco**



KOREA EAST WEST POWER CO., LTD.



SAMSUNG HEAVY INDUSTRIES



ELECTRONICS



**LG Chem**



Korea Surface  
Technology

**KCC**

KST Chromizing Carbide



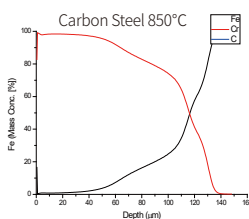
## KCC Principle of surface treatment technology

- ✓ KCC process is an in-situ CVD process with resource metal reaction in chamber
- ✓ KCC make nano carbide dispersion in the coating layer during the process
- ✓ KCC was coated 3-dimentional layer including hole and surface of the products

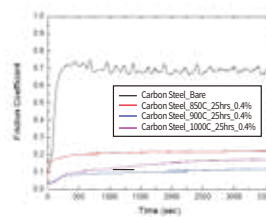
## KCC Surface treatment characteristics

### I Mechanical properties

- Depth of hardened layer : 50 $\mu$ m min.
- Surface hardness: 1500Hv min.
- Friction Coefficient around 0.2
  - Compared to about 0.7~0.8 (Raw Material)



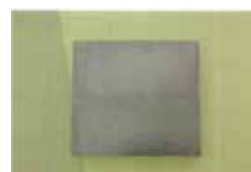
GDOES analysis  
(Hardened Layer)



Friction coefficient  
measurement

### I Chemical properties

- Salt spray test 1,000 hours without pitting
- Acid resistance test 100 hours without corrosion
- Alkali resistance test 100 hours without corrosion



Salt spray test (1,000 hours)

## KCC TECHNOLOGY FEATURES Hardness Change

### I Features

- Carbon steel, mold steel is somewhat corroded after treatment. But the corrosion resistance is higher than that of the raw material.
- Suitable for applications requiring high hardness, corrosion resistance and abrasion resistance.

### I Suitable Industries

- Corrosive chemical line, Steel mills with high Wear (Abrasion)
- Oil (Petroleum) & Gas Industry, Steel Mills, thermal Power Plant, Marine Shipyards, LNG Plant etc
- Cryogenic Metal Seated Ball Valve

## Before & After KCC Treatment

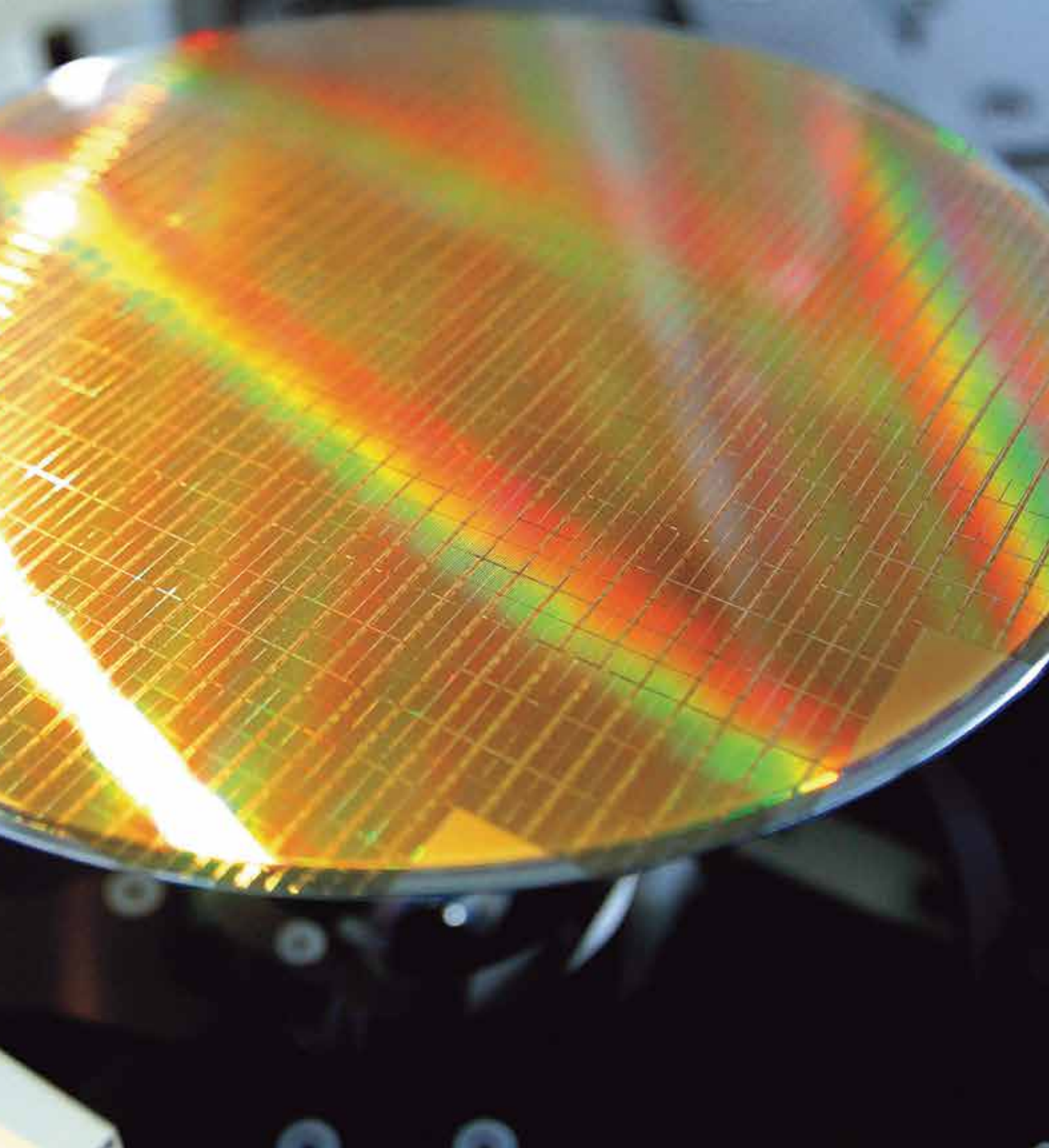
KCC Treatment	SUS304	SUS316	SUS630	SUS440	SUJ2	S45C	SKD11
Before Treatment (Hv 0.10)	250						400
After Treatment (Hv 0.10)	1,250	1,000	800	1,700	1,700	1,700	1,100
Salt Spray test of raw material	Corrosion after 3hours	No Corrosion		Corrosion after 3 hours			
Salt Spray test after KCC Treatment	No Corrosion			A tiny corrosion after 60 hours Corrosion does not progress anymore			



Korea Surface Technology

**KNN**

KST Nano Nitriding

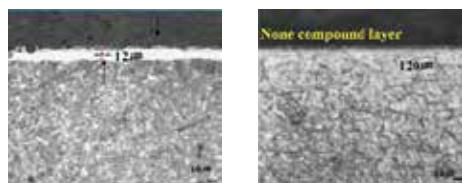




## KST Characteristics of Nano – Nitriding Surface Treatment

- ✓ Generate nitrogen atom species during the unique process with low-voltage high-density plasma resource
- ✓ Maximize diffusion rate with high surface area and adsorption rate due to the size of nitride
- ✓ Good surface roughness after treatment
- ✓ Improving coating adhesion process on the treated surface

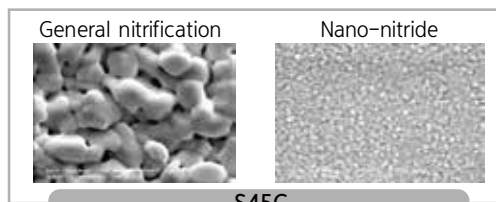
## Comparison of NANO Nitriding and Normal Nitriding



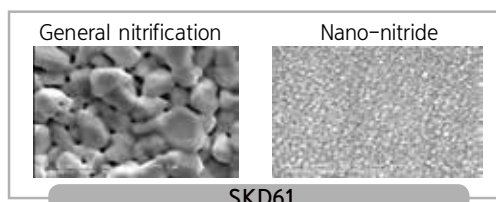
General nitriding

Nano-nitride

- ✓ General nitriding Process: 10~12μm
- ✓ Nano-Nitride Process: 120μm
- ✓ Controlled Compound Layer (CL)
- ✓ Excellent surface roughness
- ✓ High Hardness



S45C



SKD61

## KNN TECHNOLOGY FEATURES Hardness Change

### I Features

- It is suitable for hardness and low temperature of stainless steel with low hardness and high abrasion, and where it does not require corrosion
- It is suitable for surface treatment of mold with no deformation and severe wear
- In case of SUS, it is necessary to secure the technology to increase the hardness without corrosion at present (Semiconductor parts)

### I Suitable Industries

- Semi Conductor Manufacturer included Inner & Out Lines, Valves, Fitting Part etc
- Cryogenic Metal Seated Ball Valve

## Figure Change of Hardness after Nano Nitriding

Species	Before Treatment(Hv)	After Treatment(Hv)
S45C	300	800~900
SKD61	600	1100~1200
SUS316	200	1200~1300
SUS304	200	1200~1400
SUS431	200	1200~1400

A large industrial facility, likely a refinery or chemical plant, featuring a complex network of blue steel structures, yellow safety railings, and numerous large silver pipes and tanks. The sky is clear blue.

01

# KST PLANT CORPORATION

METAL SEATED BALL VALVE



## METAL SEATED BALL VALVE



- High surface hardness (Hv 1500 ↑)
- Smooth operation with low friction coefficient (Less than 0.1 ~ 0.4)
- Chemical resistance (high resistant to brine, sulfuric acid, hydrochloric acid, and phosphoric acid)
- Constant hardness at high temperature (750°C)



**In particular, the valve body inner surface treatment by the KCC on maximizing the service life by having a corrosion / abrasion resistance, such as seat & ball**

- Metal seated ball valves with KCC surface treatment of KST show superior performance for these cases: high temperature, conveying powder with high hardness, and chemical lines with severe corrosion.
- Despite its high hardness, it still shows reliability in manufacturing lines due to no brittle and stripping.
- Metal seats with ultra-precision machining have no leakage and show superior performance at high temperature and pressure.
- Superb Precise Machining Dimensions (0.005mm ↓) for Ball & Seat  
→ “Zero” Leakage
- Low Friction Coefficient (0.2 ↓)  
→ Low operating torque prevents valve malfunction and ensures stability
- Temperature Range: -40°C ~ +750°C
- Hardened Surface Treatment (Hv 1500 ↑)
- Strength of Chemical Acid Resistance
- High Corrosion Resistance  
→ Excellent Performance in High Pressure & Temperature through KCC Surface Treatment & Precise Machining Technology



## METAL SEATED BALL VALVE FEASTURES

Ball & Seat : SuS or Carbon Steel (with Cr-C SurfaceTreatment)

# 02

## KST PLANT CORPORATION

Cryogenic Metal Seated Ball Valve







## Cryogenic Metal Seated Ball Valve

- Superb Precise Machining Dimensions (0.005mm ↓) for Ball & Seat
- “Zero” Leakage
- Low Friction and Lasting Life
- Torque Figure 20 Nm (1 "Size) - Compared to General Torque Figure 30 Nm (1 ")
- Operation Temperature: +120°C ~ [-196°C], Operation Temperature Pressure 50 Bar (700PSIG)
- Very Strong for Chemical Acid Resistance
- Application - LNG Tank, LNG Vessel, LNG Plant, Low Temperature Pump, Pipeline



■ Cryogenic Metal Seated Ball Valve Test

# APPLICABLE PRODUCTS

## HIGH CORROSION RESISTANT BOLT&NUT



## CSU CHAIN



“ KST PLANT IS TECHNICAL ORIENTED COMPANY ”



## METAL SEATED BALL VALVE



## CHUTE LINER



# REFERENCE - VALUABLE CLIENTS



Plug Valve Declutch  
POSCO



Pneumatic Plug Valve  
POSCO



Hydraulic Ball Valve  
POSCO



Pneumatic Ball Valve  
HYUNDAI STEEL



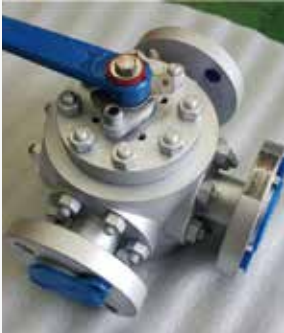
Bellows Seal Globe Valve  
OCI



Bucket Strainer  
INCHEON AIRPORT



Jacket Globe Valve  
LG Chemical



3Way Metal Seat Ball Valve  
LG Chemical



B62 Ball Valve  
MITSUBISHI(Japan)



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