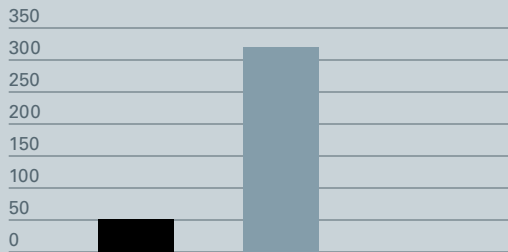


## Application specific solutions

#HITS (000)



■ Competitive TiCN ■ Ionbond™ 90 Concept

- ▶ Tool: D2 Wiping Ring
- ▶ Hardness: 58-60 HRC
- ▶ Workpiece: Steel
- ▶ Mat. Thickness: 5 mm
- ▶ 10% Material thickness reduction in process
- ▶ Failure Mode: Galling, requiring Tool Polishing

**Tool life increase by Ionbond™ 90 Concept**

### Lower cost and improved productivity

Ionbond has been offering coating services for 40 years, greatly contributing to overall cost savings and to increasing the productivity of forming and molding processes. With PVD, CVD and PACVD technology available Ionbond has the broadest offering of coatings in the industry and can select the process that suits a given situation without compromise.

- ▶ Longer tool life
- ▶ Improved part quality
- ▶ Reduced lubricant usage
- ▶ Reduced downtime
- ▶ Reduced tool maintenance
- ▶ Elimination of secondary operations



### Ionbond™ and Bernex™ multipurpose coatings

These traditional multipurpose coatings are often used in general forming and injection molding applications.

- ▶ Ionbond™ 01 TiN
- ▶ Ionbond™ 10 TiCN
- ▶ Ionbond™ 20 AlTiN
- ▶ Ionbond™ 22 TiAlCrN
- ▶ Ionbond™ 25 AlCrN
- ▶ Ionbond™ 30 CrN
- ▶ Ionbond™ 40 a-C:H:W
- ▶ Ionbond™ 41 a-C:H:W + a-C:H
- ▶ Bernex™ 02 TiC
- ▶ Bernex™ 13TiCN – TiC-TiN



## High performance coatings

The high performance coatings are specifically designed for forming and molding tools utilized in the most demanding applications where improved productivity is needed.

### lonbond™ 90 Concept

lonbond™ 90 Concept is the next generation PVD coating that combines excellent fatigue resistance, high hardness and low coefficient of friction in order to provide superior performance in the most demanding low temperature forming and molding applications. This unique combination of properties enables lonbond™ 90 Concept to provide superior performance to that of traditional PVD, CVD, and TD Coatings.

- ▶ Forming AHSS and HSLA Alloys
- ▶ Forming stainless steels
- ▶ Forming steel > 2mm in thickness
- ▶ Cold forging steel
- ▶ Piercing and forming punches – ferrous alloys
- ▶ Powder metal compaction
- ▶ Plastic injection molding – abrasion applications

### lonbond™ 35

lonbond™ 35 CrWN is a PVD coating specifically designed for high temperature forming applications. It exhibits excellent oxidation and abrasion resistance, along with superior resistance to chemical attack by molten aluminum compared to traditional PVD coatings. Its deposition temperature at 350 °C makes it compatible with the commonly used tool materials.

- ▶ Die casting
- ▶ Hot stamping (press hardening)
- ▶ Hot forging
- ▶ Tight tolerance hot extrusion
- ▶ Rubber molding
- ▶ Plastic injection molding – outgassing resins

### lonbond™ 42

lonbond™ 42, CrN + a-C:H provides a combination of high fatigue and abrasion resistance with a very low coefficient of friction and ultra-smooth surface. This makes lonbond™ 42 the preferred solution for non-ferrous forming and plastic injection molding applications.

- ▶ Piercing, forming, and trimming non-ferrous materials
- ▶ Plastic injection molding ejector pins
- ▶ Plastic injection molding – sticky resins
- ▶ Powder metal compaction





## Added capabilities and services

### Bernex™ CVD coatings for complex shapes and features

Bernex™ CVD coatings continue to find applications in the coating of molds, and dies. The nature of the chemical vapor deposition process makes it possible to coat surfaces that cannot be reached by a PVD process and makes it an ideal solution for tools with open dimensional tolerances, demanding materials and complex geometries. The coating materials include titanium-based nitrides and carbides as well as different forms of aluminum oxides and doped elements.

- Complex geometries
- Inner contours

### Bernex™ 29

Bernex™ 29 is a CVD multi-layer coating based on  $Al_2O_3$ . It exhibits excellent thermal stability, chemical inertness, and high resistance to wear. This combination of characteristics makes it the leading solution for hot extrusion applications for ferrous and non-ferrous alloys.

- Open tolerance aluminum die casting
- Open tolerance hot extrusion
- Open tolerance plastic injection molding – outgassing resins

### Quality assured

Ionbond tool coating centers hold an extensive range of international accreditations, including ISO 9001, ISO 9002, AS 9100, TS 16949, and are approved by numerous OEMs in the tool industry. On top of the quality system Ionbond has a mindset that focuses on the needs of its customers and constantly works on improving products and processes.

### Reliability and delivery

- Fast turnaround times
- Pick-up and drop-off service



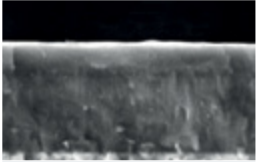
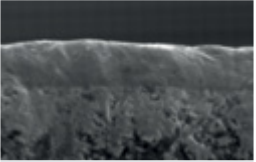
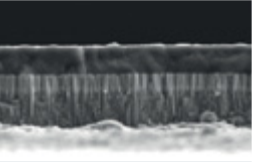
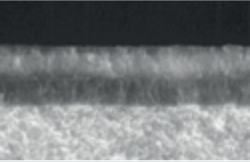
### Service

Ionbond's services don't stop with the coating. It is committed to providing added services and value including surface preparation to meet the needs of its customers.

- Pre- and postcoating polishing
- Pre- treatment processes
- Quality certifications
- Failure analysis services



## Ionbond Molding and Forming Coatings

Technology	PVD	PVD	PACVD	CVD
Coating	<b>Ionbond™ 90</b> Concept	<b>Ionbond™ 35</b> CrWN	<b>Ionbond™ 42</b> Cr + CrN + a-C:H	<b>Bernex™ 29</b> Al <sub>2</sub> O <sub>3</sub>
Typical coating thickness (µm)	6–8	5–8	1–8	8–16
Cross sections				
Deposition temperature	400°C	350°C	200–250°C	1000°C
Service temperature	300°C	800°C	300°C	1000°C
Friction vs. steel	0.12	0.3	0.1	< 0.2
Microhardness HV 0.05	3800	3000–3200	2000–2800	3000
Coating interior surfaces	Limited	Limited	Limited	Yes, incl. hidden details
Typical applications	<ul style="list-style-type: none"> <li>▶ Forming AHSS and HSLA alloys</li> <li>▶ Forming steel &gt; 2mm in thickness</li> <li>▶ Forming stainless steel</li> <li>▶ Cold forging steel</li> <li>▶ Piercing and forming punches for steel, AHSS, HSLA, and stainless alloys</li> <li>▶ Powder metal compaction</li> <li>▶ Plastic injection molding – abrasion applications</li> </ul>	<ul style="list-style-type: none"> <li>▶ Aluminum die casting</li> <li>▶ Hot stamping (press hardening)</li> <li>▶ Hot forging</li> <li>▶ Close tolerance hot extrusion</li> <li>▶ Rubber molding</li> <li>▶ Plastic injection molding – outgassing resin applications</li> </ul>	<ul style="list-style-type: none"> <li>▶ Piercing, forming, trimming non-ferrous materials</li> <li>▶ Plastic injection molding – ejector pins</li> <li>▶ Plastic injection molding – sticky resins</li> <li>▶ Powder metal compaction</li> </ul>	<ul style="list-style-type: none"> <li>▶ Open tolerance aluminum die casting</li> <li>▶ Open tolerance hot extrusion</li> <li>▶ Open tolerance plastic injection molding – outgassing resins</li> </ul>

For a complete coating listing please see [www.ionbond.com](http://www.ionbond.com)



# Competence and Innovation – Worldwide

Ionbond is a leader in surface enhancement technology and provides advanced coating solutions featuring a broad range of hard, low friction, wear resistant coatings based on PVD, PACVD and CVD technologies for a wide range of applications. It has a global presence with coating centers in strategic locations across Europe, Asia, and North America and has one of the largest coating networks in the world.

Ionbond is part of the IHI Group, a Japanese industrial group with significant R&D resources that operates through multiple business fields including: Energy and Resources, Social Infrastructure, Industrial Machinery and Aero Engines.



## Global and regional headquarters

### IHI Ionbond

Group Headquarters  
Uetlibergstrasse 132  
CH-8045 Zürich  
Phone: +41 44 298 50 70  
Fax: +41 44 298 50 99  
info@ionbond.com

### Ionbond France – Lyon

Services Headquarters  
Europe Zone 1  
25, rue des Frères-Lumière  
FR-69680 Chassieu  
Phone: +33 4 72 79 46 60  
Fax: +33 4 72 79 46 61  
infofr@ionbond.com

### Ionbond Switzerland – Olten

Equipment Headquarters  
Industriestrasse 211  
CH-4600 Olten  
Phone: +41 62 287 86 86  
Fax: +41 62 287 85 93  
equipment@ionbond.com  
infoch@ionbond.com

### Ionbond China – Wuxi

Services Headquarters  
Asia  
Building 17-B  
No. 15 Hanjiang Road  
Wuxi New District  
Wuxi City, Jiangsu Province  
China (Postcode: 214028)  
Phone: +86 510 8815 2528  
Fax: +86 510 8181 6819  
infoch@ionbond.com

### Ionbond Netherlands – Venlo

Services Headquarters  
Europe Zone 2  
van Heemskerckweg 30  
NL-5928 LL Venlo  
Phone: +31 77 465 65 65  
Fax: +31 77 351 34 99  
infofl@ionbond.com

### Ionbond US – Michigan

Services Headquarters  
NAFTA  
1823 East Whitcomb  
Madison Heights  
USA MI 48071  
Phone: +1 248 398 9100  
Fax: +1 248 398 2110  
infous@ionbond.com

See our website for a full list of all coating centers and local equipment sales offices. [www.ionbond.com](http://www.ionbond.com)



# FORMING AND MOLDING

