



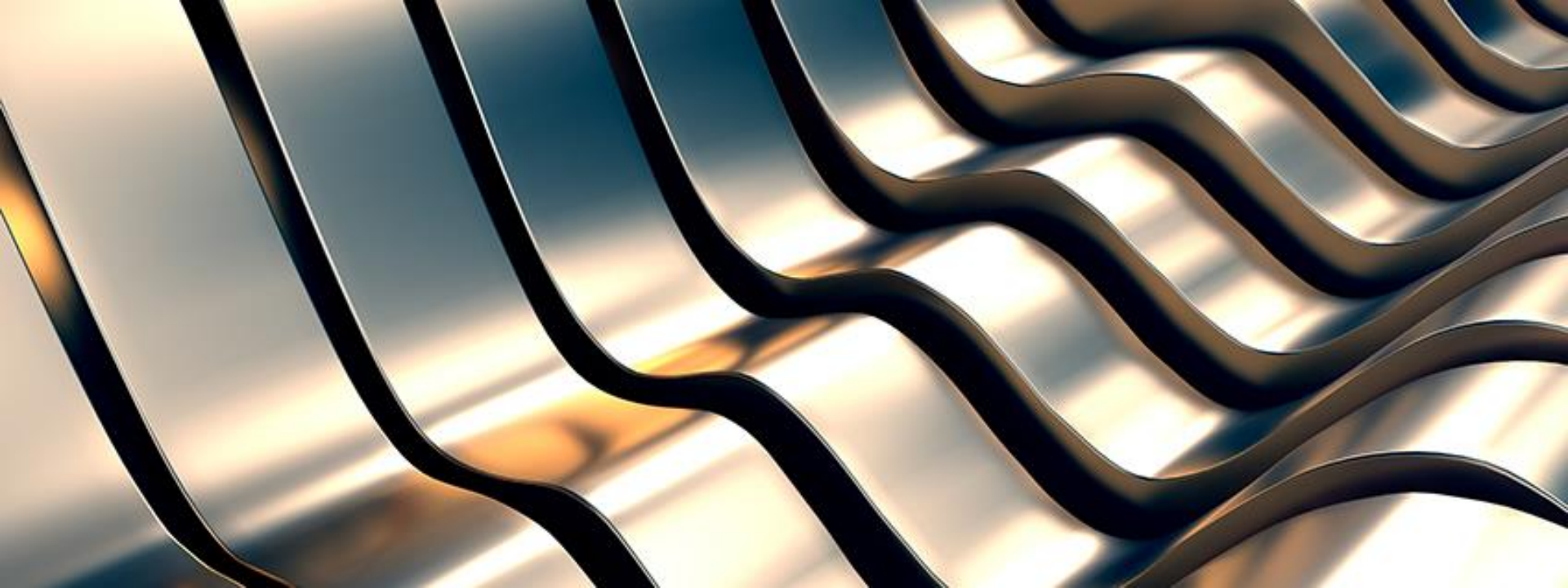
PVD COATINGS
FOR ALUMINUM

KOLZER SRL



OVERVIEW

- Why PVD on aluminum?
- The excellence of metallic finishes
- The process
- Advantages of technology
- Case history
- Passed tests
- Critical to success factors
- Conclusions
- KOLZER PVD Machines



WHY PVD ON ALUMINUM?

It is a chemical element, which is found naturally on Earth. It is the most abundant metal on our planet, as it makes up roughly 8% of the crust on the surface. It is very versatile, making it the second most used metal after steel in various ways such as in automobiles manufacturing and buildings.

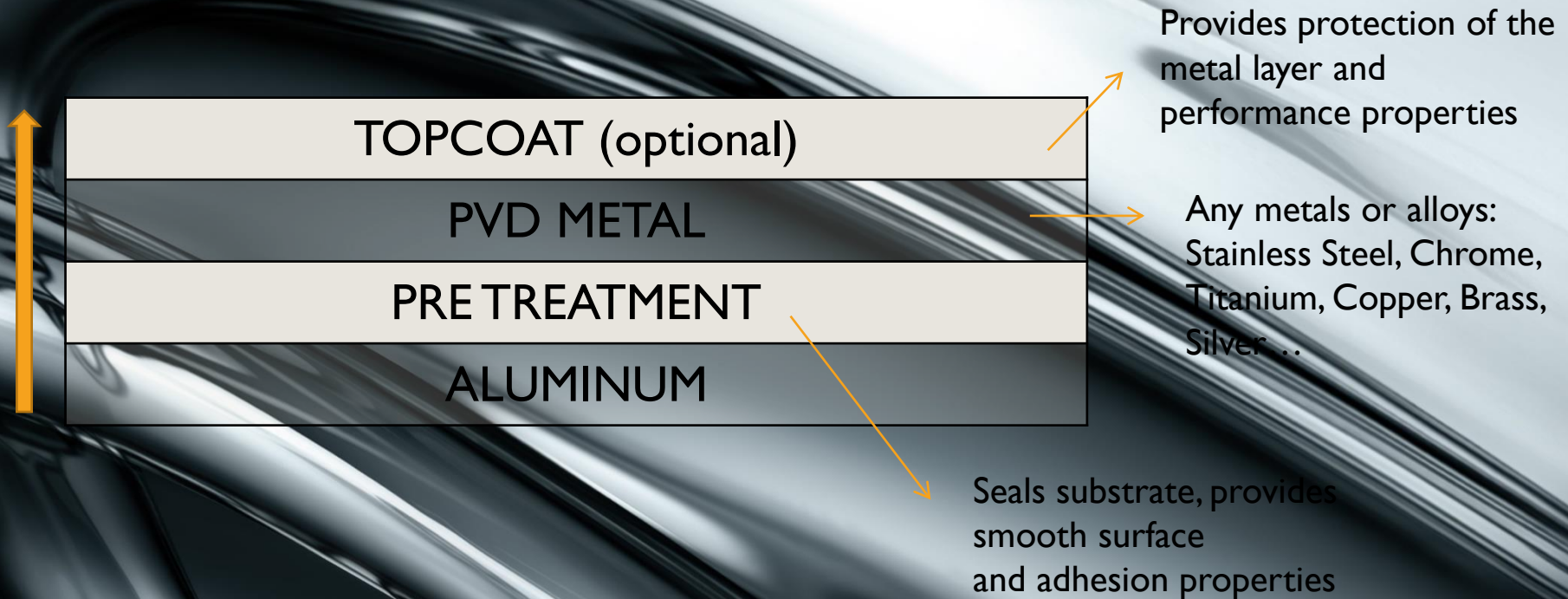
Aluminum's versatile nature is being touted by environmentalists as a viable alternative to plastic, which has become one of the world's most detested environmental pollutants.



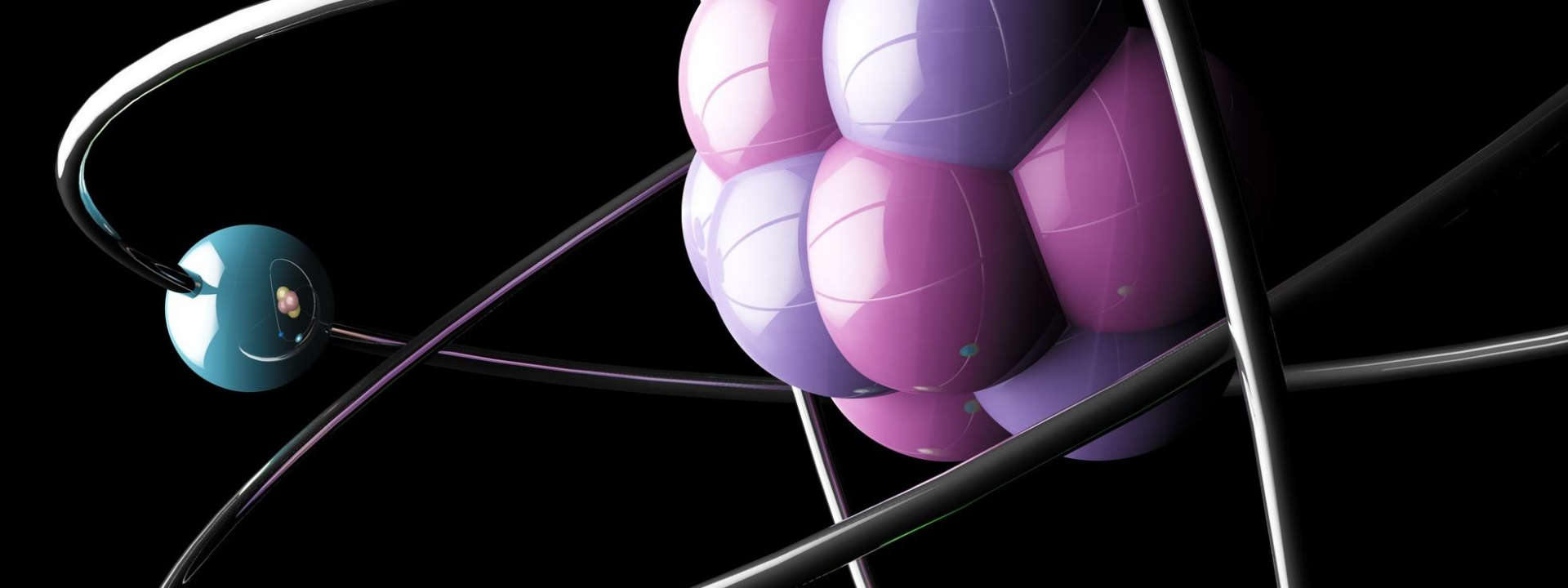
KOLZER PVD: THE EXCELLENCE OF METALLIC FINISH

- environmental: clean process at room temperature, without water, totally free of chemical emissions
- aesthetic: brilliant metallic finish, vast array of colors and polish variations
- functional: durable, high hardness, abrasion and corrosion resistant
- productivity: extremely economical and short machine cycles, high repeatability, diminished imperfections

KOLZER PVD: THE PROCESS





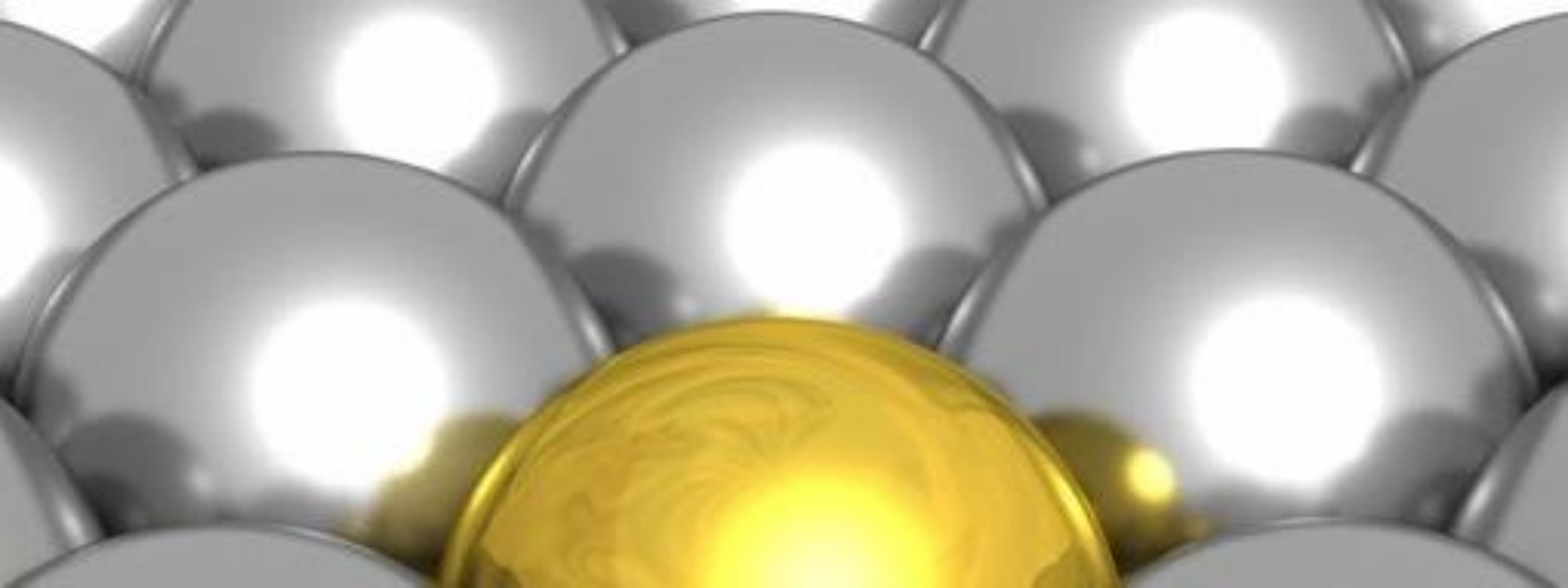


KOLZER PVD COATINGS FOR ALUMINUM

KOLZER had set up a PVD process for all kinds of aluminum present in the market: forged, extruded and pressofused.

Thanks to our advanced technology and know-how (patented proprietary process) we succeed in treating aluminum directly with PVD coatings, reaching the best performance ever!





KOLZER PVD: ADVANTAGES OF TECHNOLOGY

- Environmentally Friendly
- Uniform deposition
- Low temperature
- Repeatable
- Adjustable thickness (full or semi-transparent)
- Multilayers
- No Hexavalent Chrome
- Elimination of Chemical Disposal
- Reduced Steps In Process
- Reduced Cycle Time
- Smaller Footprint
- Minimizes need to outsource

- # 1200 operative PVD Machines
- More than 70 years of history and experience
- Partner for innovative projects of the most important Companies in the world

KOLZER marks the next steps of the PVD process!

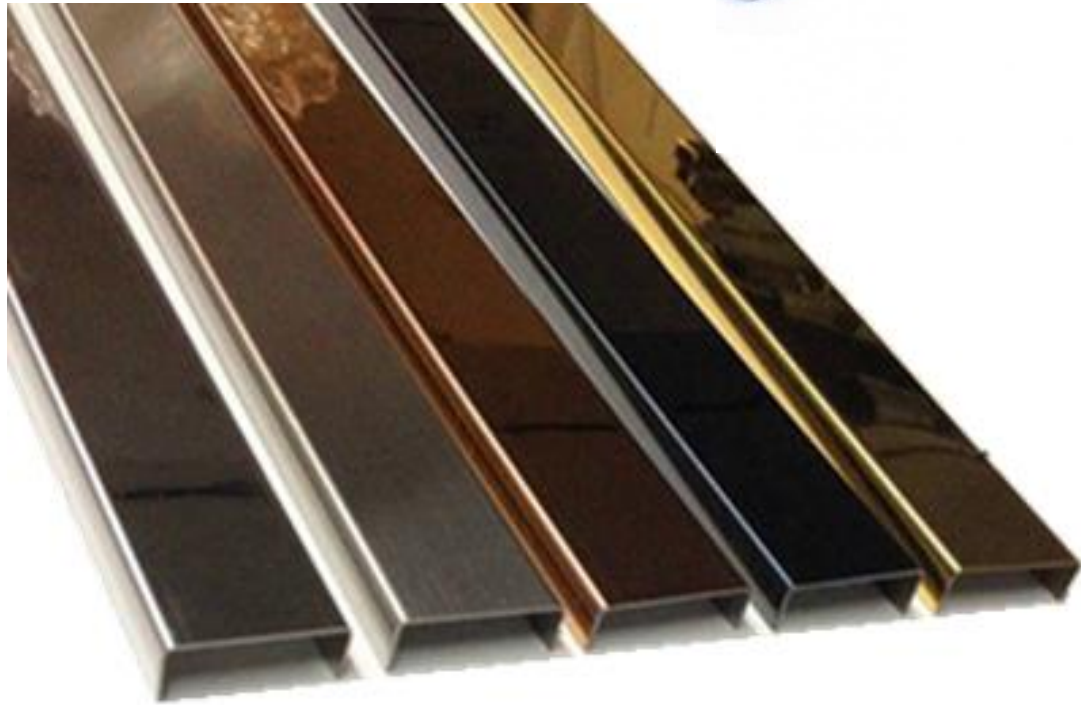


Kolzer



KOLZER PVD: CASE HISTORY





SOME TESTS PASSED BY KOLZER PVD

TEST ACCORDING TO THE AUTOMOTIVE STANDARD	N.	REQUIREMENT
Appearance	1	OK
Cross-cut ISO 2409	2.1	G<= 1
Cross-cut St. Andrew	2.2	no detachment
Scratch Erichsen type 318	3	tear-off not permissible
Dimension stability 240 h at 90°	4.1	No visible change + table 2.1 / 2.2
Environmental PV 1200 8 cycles	4.2	No visible change + table 2.1 / 2.2
ISO 6270-2 (Humidity)	5.1	No visible change + table 2.1 / 2.2
Lightfastness PV 1303 6 cycles	5.2	Gray scale >=4
Hydrolysis aging 72 h at 90°	5.3	No visible change + table 2.1 / 2.2
Sunlight simulation DIN 75220	5.4	No visible change + table 2.1 / 2.2
Corrosion properties	5.5	DIN EN ISO9227
100 strokes, dry	6.1.1	Gray scale >=4
100 strokes, wet	6.1.2	Gray scale >=4
2000 strokes, dry	6.1.3	Gray scale >=4
10 strokes aqueous with 0,5 volume percent tenside	6.1.4	Gray scale >=4
10 strokes with glass cleaner	6.1.5	Gray scale >=4
10 strokes with cleaner's naphtha	6.1.6	Gray scale >=4
10 strokes with methylated spirit	6.1.7	Gray scale >=4
10 strokes with synthetic sweat A	6.1.8	Gray scale >=4
10 strokes with synthetic sweat B	6.1.9	Gray scale >=4
Droplet test 0,5 percent tenside	6.2.1	No visible change
Droplet test cleaning solution	6.2.2	No visible change
Droplet test cleaner's naphtha	6.2.3	No visible change
Droplet test methylated spirit	6.2.4	No visible change
Droplet synthetic sweat A	6.2.5	No visible change
Droplet synthetic sweat B	6.2.6	No visible change
PV 3964	6.3	No visible change
Scrub resistance high-gloss	7	No visible change



CRITICAL TO SUCCESS FACTORS

- Moisture Resistance
- Temperature Shock Resistance
- Chemical Resistance
- Corrosion Resistance
- Impact Resistance
- Scratch and Abrasion Resistance
- Weathering Resistance



CONCLUSIONS

KOLZER PVD is:

- safer and more environmentally friendly than chrome plating.
- more process friendly, requiring less steps than chrome plating.
- able to meet the OEMs toughest requirements.
- suitable for designers to have more flexibility and more choices when designing products.

Our PVD Machine: Vertical range MK®



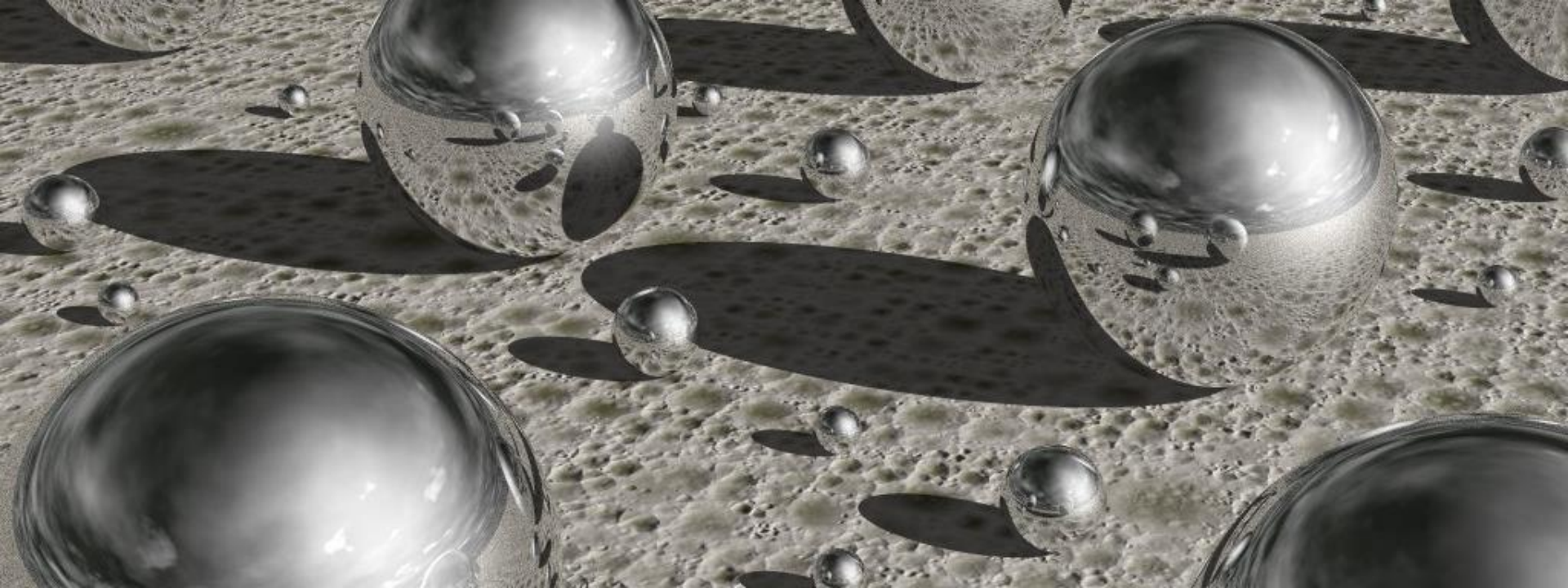
MK63" diameter 1600 mm

2 doors vertical configuration for a quicker working cycle

Our PVD Machine: Horizontal range DGK®



- DGK36" diameter 1000 mm
- DGK48" diameter 1200 mm
- DGK63" diameter 1600 mm



THANK YOU

KOLZER SRL

via Francia, 4

20093 Cologno Monzese, Milan, Italy

info@kolzer.com

ph: +39 02 25 43 193

www.kolzer.com