

# THIN FILM COATINGS FOR IMPROVED VACUUM PERFORMANCE

Thin film coatings are widely used in industry to improve the quality of a vacuum.

CERN experts have significant expertise across a range of thin film coating techniques for producing High & Ultra-High Vacuum, particularly Non-Evaporable Getter (NEG) thin film coatings. NEG coatings are produced by sputtering an alloy of several selected metals onto a vacuum chamber wall. When activated by heating, the NEG chemically reacts to reduce the amount of gas in the vacuum chamber. NEG coatings also block the outgassing of the underlying vacuum chamber walls.

CERN experts can provide consultancy, training and licensing of proprietary CERN techniques for the application of NEG coatings.

## AREA OF EXPERTISE

- High & Ultra-High Vacuums

## IP STATUS

- CERN experts can provide consultancy, training and licensing of proprietary CERN techniques for the NEG coatings application.
- Patent WO1997EP03180 (filed 1997) now expired.

## CONTACT

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Find out more at: [kt.cern](http://kt.cern)

## FEATURES

Consultancy, training and licensing of proprietary CERN techniques in:

- Production of NEG thin films (vacuum, sputtering, surface preparation, adhesion)
- Preparation of sputtering targets
- Coating of vacuum chambers
- Monitoring of NEG coatings activation by XPS
- Measurement of vacuum performance of NEG coatings
- Use of MolFlow software for vacuum calculations and thin film thickness profiles

## APPLICATIONS

- Improvement of pumps or creation of innovative pumps
- Electron and cathode tubes
- Vacuum thermal insulation at high temperature (solar applications)
- Vacuum components of any types (blanks, bellows, crosses, Tees, transitions) to replace or complement pumps of other types
- Microelectronics
- Vacuum thermal insulation at low temperature



## ADVANTAGES

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- Reversible process for hydrogen
- Up to 50 venting cycles possible with marginal performance loss
- The chemical reactivity of the NEG can be recovered by heating at temperature as low as 180°C

## LIMITATIONS

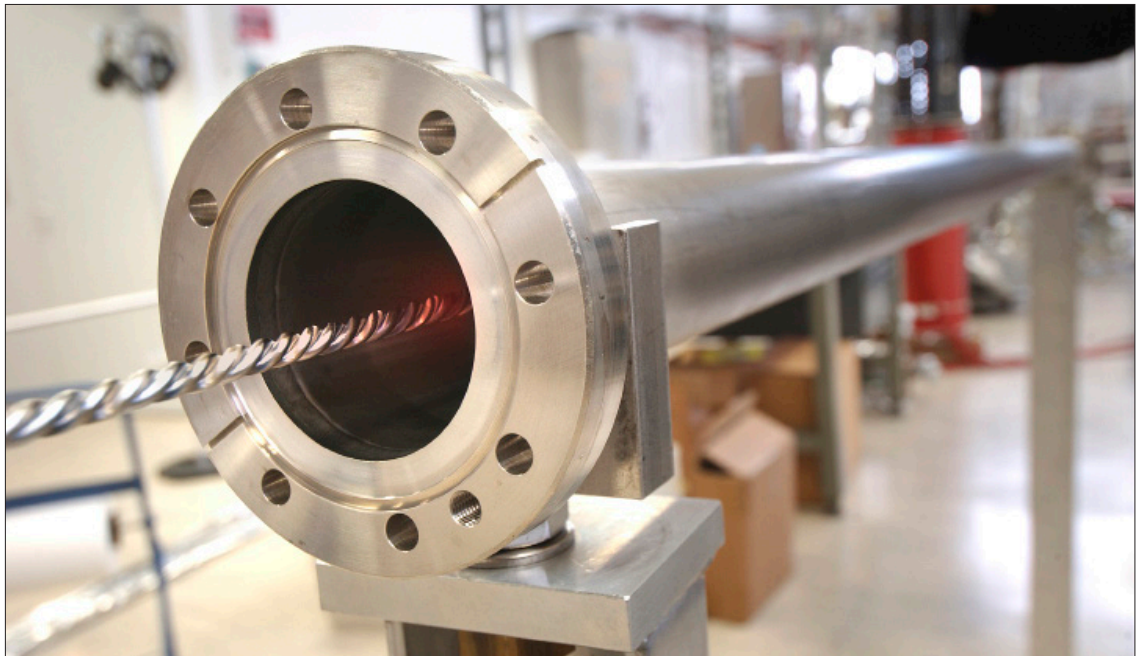
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- Cannot be exposed too often to ambient air
- Requires high degree of know-how

## SPECIFICATIONS

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- Baking at temperature in the range 180°C to 400°C
- Ultra-high vacuum is achieved (10e-13 Torr)



*technology*

Knowledge Transfer  
Accelerating Innovation