

Depleted Zinc for the Nuclear Industry



- Zinc, depleted in the isotope ^{64}Zn , is a product for the water chemistry of nuclear power plants (NPPs).
- Depleted Zinc in form of sintered Zinc Oxide Pellets is used in boiling water reactors (BWR).
- Depleted Zinc in form of Zinc Oxide Powder or Zinc Acetate is used in pressurized water reactors (PWR).
- The aim of using Depleted Zinc is to reduce corrosion in the primary water circuit in order to reduce occupational radiation exposure for NPP personnel (possible reduction of collective dose rate is approx. 50 %).
- Another goal is the reduction of the potential for stress corrosion cracking in PWRs.
- American BWRs (mainly GE types) started with the use of Zinc Oxide in form of natural zinc. The residual dose uptake problem from the activation of ^{64}Zn to ^{65}Zn has been successfully avoided in the United States, Mexico and some European countries by using Depleted Zinc.

DZO - Pellets

Specification

- Material ⁶⁴Zn Depleted Zinc Oxide in form of sintered pellets
- Isotopic content ⁶⁴Zn < 1 at%
- Purity > 99.8 wt% ZnO on dry-basis
- Density > 4.77 g/cm³
- Mean dimensions $\varnothing = 10$ mm / h = 10 mm

Impurities in $\mu\text{g/g}$

Ag, As, Au	< 10
Al	< 100
B, Ba, Be, Bi, Br	< 10
C	< 500
Ca, Cd, Ce, Cl	< 10
Co, Cr, Cs, Cu	< 10
Dy	< 10
Er, Eu	< 10
F	< 10
Fe	< 30
Ga, Gd, Ge	< 10
Hf, Ho	< 10
Hg	< 2
I, In, Ir	< 10
K	< 10
La, Li, Lu	< 10
Mg, Mn, Mo	< 10
N	< 10
Na	< 50
Nb, Nd, Ni	< 10
Os	< 10
P	< 20
Pb, Pd, PO ₄ , Pr, Pt	< 10
Rb, Re, Rh, Ru	< 10
S	< 50
Sb, Sc, Se	< 10
Si	< 50
Sm	< 10
Sn, SO ₄	< 50
Sr	< 10
Ta, Tb, Te, Th, Ti, Tl, Tm	< 10
U, V, W	< 10
Y, Yb	< 10
Zr	< 10
Rare Earth	< 20
Insoluble in HCl	< 100
Remaining Impurities	< 20

DZO - Powder

Specification

- Material ⁶⁴Zn Depleted Zinc Oxide in form of Zinc Oxide Powder
- Isotopic content ⁶⁴Zn < 1 at%
- Purity > 99.8 wt% ZnO on dry- basis
- Specific surface > 20 m²/g
- Particle Size
d_{50%} < 1.5 μm
d_{90%} < 2.6 μm
d_{max} < 10 μm

Impurities in μg/g

Ag	<	20
Al	<	100
As	<	20
B, Ba, Bi, Br	<	20
C	<	1250
Ca	<	50
Cd, Cl, Co, Cu	<	20
F	<	20
Fe	<	30
Hf, Hg	<	20
I, In	<	20
Mn	<	20
Na, Ni	<	20
P	<	20
Pb	<	30
S	<	100
Sb	<	20
Si	<	50
Sn	<	150
SO ₄	<	50
Ti	<	20
V	<	20
Rare Earth	<	20
Remaining Impurities	<	20
Insoluble in HCl	<	100

Depleted Zinc Acetate Z

Specification

- Material ⁶⁴Zn Depleted Zinc in form of Zinc Acetate
- Isotopic content ⁶⁴Zn < 1 at%
- Purity > 99.8 wt% Zn on dry- basis

Impurities in µg/g

Ag	<	20
Al	<	100
As, Au	<	20
B, Ba, Be, Bi, Br	<	20
Ca	<	50
Cd, Ce	<	20
Cl	<	50
Co, Cr, Cs, Cu,	<	20
Dy	<	20
Er, Eu	<	20
F	<	20
Fe	<	30
Ga, Gd, Ge	<	20
Hf, Hg, Ho	<	20
I, In, Ir	<	20
K	<	20
La, Li, Lu	<	20
Mg, Mn, Mo	<	20
N	<	20
Na	<	50
Nb, Nd, Ni	<	20
Os	<	20
P, Pb, Pd, PO ₄	<	20
Pr, Pt	<	20
Rb, Re, Rh, Ru	<	20
S	<	50
Sb, Sc, Se	<	20
Si	<	50
Sm	<	20
Sn	<	100
SO ₄	<	50
Sr	<	20
Ta, Tb, Te, Th	<	20
Ti, Tl, Tm	<	20
U	<	20
V	<	20
W	<	20
Y, Yb	<	20
Zr	<	20
Rare Earth	<	20
Insoluble in HCl	<	100

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