Pitting Resistance Equivalent Number (PREN)

Pitting resistance equivalent number of a stainless steel or nickel alloy from its chromium, molybdenum, tungsten and nitrogen contents, with the 30N variant.

Method: PREN = Cr + 3.3(Mo + 0.5W) + 16N (wt %); the form used in ISO 15156-3 and duplex grade definitions

Input parameters

Unit system: SI

Parameter	Value	Unit
Chromium (wt %)	22.000	%
Molybdenum (wt %)	3.0000	%
Tungsten (wt %)	0	%
Nitrogen (wt %)	0.17000	%

Calculated results

Parameter	Value	Unit
PREN (16N)	34.620	
PREN (30N)	37.000	

Notes for this case

• Rough guide: 304 about 19, 316L about 24, duplex 2205 about 35, super duplex and 6Mo grades above 40. PREN ranks alloys; it does not predict pitting in a given water, which also depends on chloride, temperature and crevices.

Formula and method

$$PREN = Cr + 3.3(Mo + 0.5W) + 16N$$

Variables

Cr	Chromium (wt %)	-
Mo	Molybdenum (wt %)	-
W	Tungsten (wt %)	-
N	Nitrogen (wt %)	-
$PREN_{16}$	PREN (16N)	-
$PREN_{30}$	PREN (30N)	-

Method and standards

Weighted composition index.

Assumptions and limits

- Wrought stainless steels and nickel alloys.

References

• PREN = Cr + 3.3(Mo + 0.5W) + 16N (wt %)
• the form used in ISO 15156-3 and duplex grade definitions

Report details

Report reference	FCC-8EDD-GA0G (the same inputs always give the same reference)
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Release checks	3 reference cases of this calculator, computed independently, are checked on every release

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/materials/corrosion/pren-pitting-resistance

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.