

# NAUTICUS™ MACHINERY

## Gear Faceload and Gear Rating

Calculation of contact stresses, scuffing and fatigue capacity, and faceload distribution in marine reduction gears.



The Nauticus Machinery gear package is divided into two tools - Gear Rating and Gear Faceload - and both tools share most of the same input. The calculation procedures cover gear rating as limited by contact stresses (pitting, spalling or case crushing), tooth root stresses (fatigue breakage or overload breakage), and scuffing resistance.

The faceload calculation combines the elastic deflection of the pinion and gear with other linear misalignments. The faceload tool can be used as input to gear rating tool or for verification of the tooth contact patterns by lacquer test during sea trial. The tool is made primarily for the purpose of checking. However, as all input data may be altered interactively it is also suitable for design optimization of the helix modification in particular.

The Gear Rating program contains three calculation standards: DNV standards, ISO6336 standard and ISO10300 standard. The DNV standards are Class Guidelines 0036 (Gear rating for marine transmissions) and 0041 (Ice strengthening of propulsion machinery). The CG-0036 is mainly based on the ISO-6336 Part 1-5 (cylindrical gears), and partly on ISO 10300 Part 1-3 (bevel gears) and ISO Technical Reports on Scuffing and Fatigue Damage Accumulation. The DNV standard is applied for marine purposes, such as marine propulsion and important auxiliaries onboard ships and mobile offshore units. Calculation results can be sent directly to printer or exported to Microsoft Office applications.

### Benefits:

- Based on DNV's long term experience with marine gears
- Visual representation and animation of gear geometry
- Graphical representation of lead modifications
- The program includes three calculation standards: DNV standard, ISO 6336 standard and ISO 10300 standard
- Flexible report generator
- Printout of standard gear data sheet
- Calculates sub-surface fatigue criteria
- Revised scuffing calculation routines compared to previous program
- Enhanced method for root safety on bevel gears in marine applications
- Support for IACS Polar ice class and Baltic ice class
- Estimation of torque loads due to ice impacts