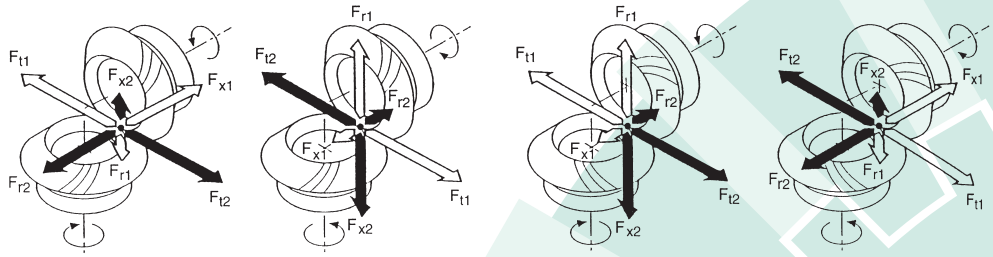
# LOAD-BEARING CAPACITY OF BEVEL GEARS FOR TRANSMISSIONS BETWEEN ORTHOGONAL AXES WITH SPIRAL TOOTHING

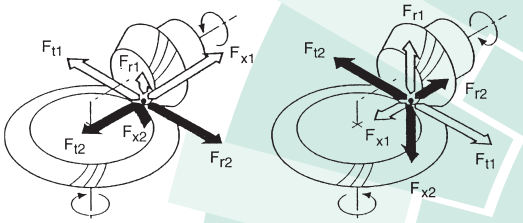
The "GLEASON" system range of bevel gears with spiral toothing is an extension of the range of standard bevel gear pairs with which this range shares the declared intentions and objectives.
The criteria adopted comply as closely as possible with International Standards as regards general sizing and the definition of the geometric features, whereas the choice of the key nominal data has been based on a progression depending on the range of the normal numbers established by the DIN 323 and ISO R3/R17 standards.
The spiral toothing complying with the "GLEASON" system is the result of a specific project designed to achieve optimised functional features compared with the geometric parameters that frequently conflict with each other.
The key sizing for the toothing, in particular refers to the following:
- The choice of a reduced tooth height - Correction by profile displacement - Adoption of a normal pressure angle:
$\alpha n = 20°$ - The constant tooth bottom gap along the whole tooth surface and other geometric solutions. This series of bevel gear with spiral toothing is designed for general use in plants and in general mechanical applications. The project has been designed therefore, to privilege the mechanical performance normally requested by this sector and special attention has been paid in defining the geometric features that can determine the tooth covering factor and the restraining reactions which determine the load on the bevel gear pair bearings.
By their very nature bevel gears with spiral toothing are designed for a more demanding use compared with that of straight teeth bevel gear pairs therefore, CHIARAVALLI TRASMISSIONI has made available the Company's range of bevel gear pairs with the intention of providing a solution that will be appreciated by the users of this product.
**Naturally and in the framework of the Company's traditional technical collaboration with end users, the CHIARAVALLI TRASMISSIONI technical office is available to provide suggestions concerning more specific circumstances and problems.**

**Directions and angles of forces acting on spiral bevel gears**

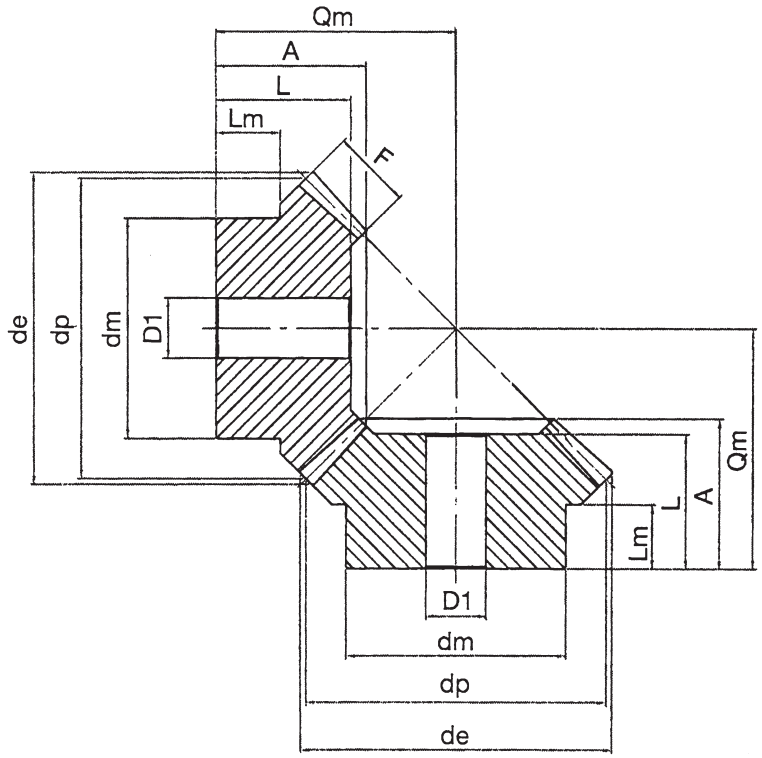
**R. 1:1**




**R. 1:2**



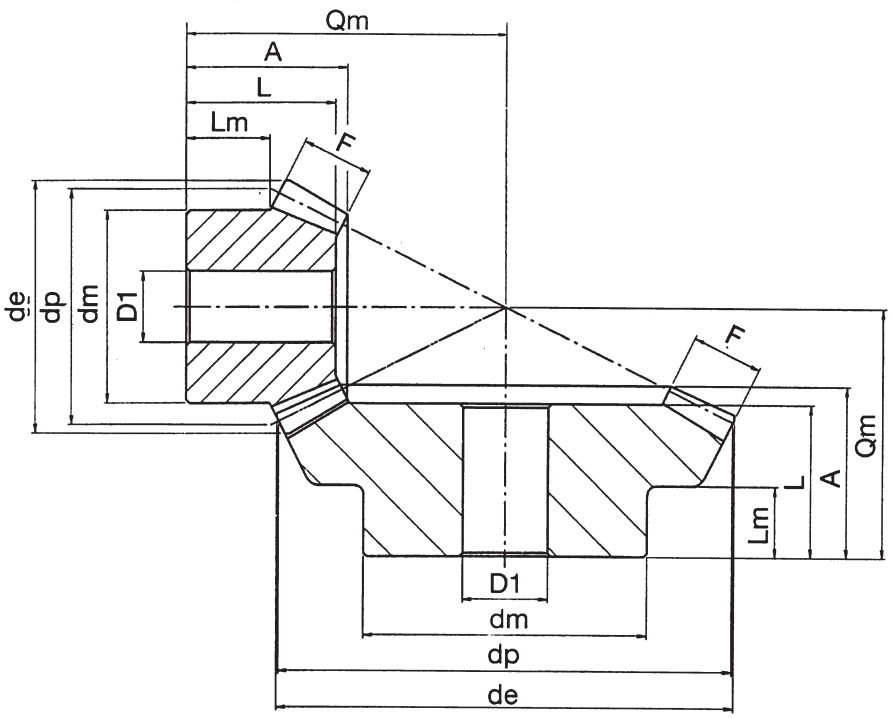

**Pinion with left-handed spiral as the drive wheel**
**Sprocket with right-handed spiral as the driven wheel**




**RATIOS 1:1**

| M | z | dp | dm | D1 | F | de | Lm | L | A | Qm | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.5 | 16 | 24 | 18 | 8 | 6 | 25.3 | 9 | 16 | 16.7 | 24 | |
| | 20 | 30 | 22 | 8 | 7 | 31.3 | 10 | 18 | 19.4 | 29 | -0.05 |
| | 25 | 37.5 | 28 | 8 | 8 | 38.8 | 11.5 | 21 | 22.5 | 35 | -0.10 |
| | 30 | 45 | 32 | 10 | 10 | 46.3 | 11 | 23 | 25.1 | 40 | |
| 2 | 16 | 32 | 25 | 10 | 9 | 34 | 9.45 | 16.9 | 19.9 | 29 | |
| | 20 | 40 | 32 | 10 | 12 | 42 | 11.95 | 21.7 | 24.9 | 36 | -0.05 |
| | 25 | 50 | 40 | 12 | 14 | 52 | 11.9 | 24.8 | 27.4 | 42 | -0.10 |
| | 30 | 60 | 50 | 12 | 16 | 62 | 12.95 | 26.9 | 29.9 | 48 | |
| 2.5 | 16 | 40 | 32 | 12 | 10 | 42.5 | 13 | 21.8 | 24.8 | 37 | |
| | 20 | 50 | 40 | 12 | 12 | 52.5 | 16 | 26.7 | 30.2 | 46 | -0.05 |
| | 25 | 62.5 | 50 | 15 | 15 | 65 | 16 | 29.9 | 33.2 | 53 | -0.10 |
| | 30 | 75 | 55 | 15 | 18 | 77.5 | 16 | 31.8 | 35 | 59 | |
| 3 | 16 | 48 | 40 | 15 | 12 | 51 | 16 | 25.8 | 29.4 | 44 | |
| | 20 | 60 | 45 | 15 | 18 | 63 | 13.5 | 30.7 | 34.5 | 51 | -0.076 |
| | 25 | 75 | 55 | 15 | 20 | 78 | 16 | 33.7 | 37.5 | 60 | -0.127 |
| | 30 | 90 | 60 | 20 | 22 | 93 | 19 | 35.8 | 39.5 | 68 | |
| 4 | 16 | 64 | 50 | 15 | 15 | 68 | 17.75 | 30.8 | 36 | 56 | |
| | 20 | 80 | 60 | 18 | 17 | 84 | 18 | 32.5 | 37.5 | 64 | -0.102 |
| | 25 | 100 | 70 | 20 | 21 | 104 | 18 | 35.2 | 40.4 | 74 | -0.152 |
| | 30 | 120 | 80 | 25 | 25 | 124 | 16 | 38.1 | 43.2 | 84 | |
| 5 | 16 | 80 | 60 | 20 | 17 | 85 | 18.9 | 35.5 | 41.9 | 68 | |
| | 20 | 100 | 70 | 20 | 21 | 105 | 18.5 | 37.7 | 44.8 | 78 | -0.127 |
| | 25 | 125 | 90 | 20 | 26 | 130 | 18.5 | 41.8 | 47.8 | 90 | -0.178 |
| | 30 | 150 | 110 | 30 | 32 | 155 | 18 | 45.7 | 52.5 | 103 | |

MATERIAL: C 43 UNI 7847




**RATIOS 1:2**

| M | z | dp | dm | D1 | F | de | Lm | L | A | Qm | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.5 | 16 | 24 | 20 | 10 | 8 | 26.50 | 9.5 | 17 | 18.6 | 35 | -0.05<br>-0.10 |
| | 32 | 48 | 32 | 12 | 8 | 48.30 | 10 | 18 | 20.0 | 28 | -0.05<br>-0.10 |
| 2 | 16 | 32 | 27 | 10 | 10 | 35.50 | 11.7 | 21 | 22.5 | 45 | -0.05<br>-0.10 |
| | 32 | 64 | 40 | 12 | 10 | 64.50 | 10 | 21.5 | 24.1 | 35 | -0.05<br>-0.10 |
| 2.5 | 16 | 40 | 32 | 12 | 12 | 44.50 | 14 | 25.1 | 27.5 | 56 | -0.05<br>-0.10 |
| | 32 | 80 | 50 | 15 | 12 | 80.50 | 15 | 25.9 | 29.2 | 43 | -0.05<br>-0.10 |
| 3 | 16 | 48 | 40 | 15 | 15 | 53.50 | 12 | 25.2 | 28.4 | 62 | -0.076<br>-0.127 |
| | 32 | 96 | 60 | 15 | 15 | 97.00 | 15 | 29.8 | 34.6 | 51 | -0.076<br>-0.127 |
| 4 | 16 | 64 | 50 | 20 | 20 | 71.50 | 13.5 | 32.2 | 36.2 | 81 | -0.102<br>-0.152 |
| | 32 | 128 | 80 | 20 | 20 | 129.00 | 23 | 38.7 | 44.2 | 66 | -0.102<br>-0.152 |
| 5 | 16 | 80 | 60 | 20 | 25 | 89.50 | 21 | 45.3 | 50.0 | 106 | -0.127<br>-0.178 |
| | 32 | 160 | 90 | 25 | 25 | 162.00 | 27 | 46.8 | 53.7 | 81 | -0.127<br>-0.178 |

MATERIAL: C 43 UNI 7847