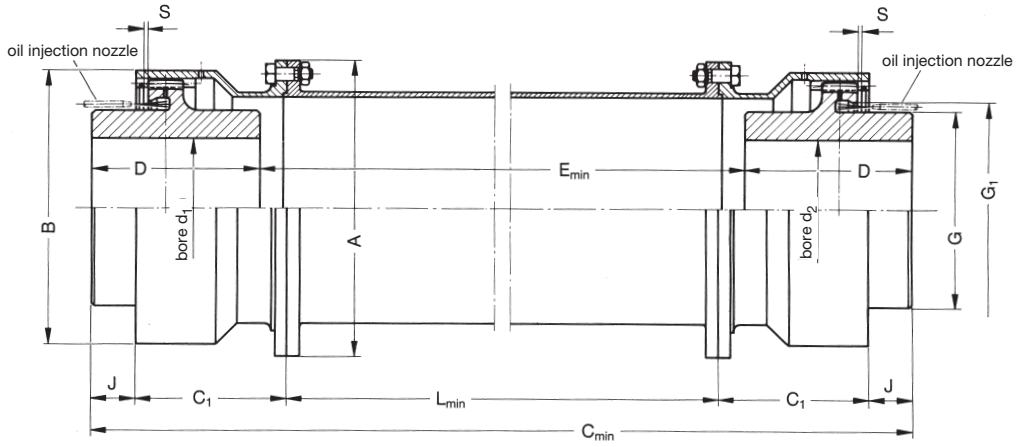
# Curved Tooth Couplings

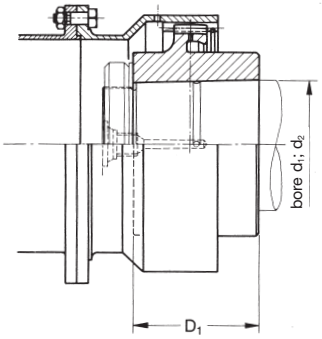
## High-Speed Series ZTNH and ZTKH

Hardened and ground gear teeth
Dimension table No. 243 110/1

**Series ZTNH with cylindrical bore**




**Series ZTKH with tapered bore**




**Sizes 45 to 205 are available from stock, without spacer.**
Larger sizes on request.

For hubs with tapered bore, the hub length $D_1$ can be maximum increased to dimension D. For technical reasons, hydraulic fits require the supply of the pressure oil through the shaft.

For coupling selection and size determination, please see page 5.

1) Values of the complete coupling, series ZTNH, with E = $E_{min}$ and bore $d_1$; $d_{2\,max}$

2) Internal gear teeth not ground

| Coupling Type **ZTNH + ZTKH** Size new | old | Normal cont. operation $P_{KN}$ / n kW·min | Speed $n_{max}$ rpm | Dimensions bore $d_1$; $d_2$ min mm | max mm | A mm | B mm | $C_{min}$ mm | $C_1$ mm | D mm | $D_1$ mm | $E_{min}$ mm | G mm | $G_1$ mm | J mm | $L_{min}$ mm | S mm | Oil injection nozzles per half Quantity and size mm | Total oil requirement per min at 1.5 bar pressure litre | Mass moment of inertia J [1] kgm² | per 10 mm tube length, if L > $L_{min}$ kgm² | Weight [1] kg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **35** | – | 0,11 | 40.000 | 18 | 35 | 117 | 82 | 166 | 49 | 45 | 35 | 76 | 50 | 60 | 9 | 50 | 1,5 | 1xØ2 | 4,5 | 0,0044 | 0,000091 | 3,1 |
| **40** | – | 0,14 | 37.500 | 20 | 40 | 127 | 88 | 176 | 54 | 50 | 40 | 76 | 56 | 66 | 9 | 50 | 1,5 | 1xØ2 | 4,5 | 0,0062 | 0,00011 | 3,8 |
| **45** | 10 | 0,19 | 32.000 | 35 | 45 | 123 | 104 | 212 | 85 | 55 | 45 | 102 | 64 | 74 | - 4 | 50 | 2,5 | 1xØ2 | 4,5 | 0,0099 | 0,000088 | 5,4 |
| **55** | 20 | 0,32 | 28.000 | 40 | 55 | 133 | 120 | 228 | 88 | 65 | 55 | 98 | 77 | 87 | 1 | 50 | 2,5 | 1xØ2 | 4,5 | 0,017 | 0,00013 | 7,2 |
| **63** | 30 | 0,51 | 25.000 | 45 | 63 | 148 | 135 | 251 | 95 | 75 | 65 | 101 | 88 | 101 | 5,5 | 50 | 2,5 | 1xØ2,5 | 7 | 0,027 | 0,00020 | 9,5 |
| **73** | 40 | 0,79 | 22.000 | 50 | 73 | 168 | 155 | 283 | 100 | 90 | 75 | 103 | 102 | 118 | 16,5 | 50 | 3 | 1xØ2,5 | 7 | 0,048 | 0,00034 | 13 |
| **85** | 50 | 1,23 | 20.000 | 55 | 85 | 188 | 174 | 309 | 102 | 105 | 90 | 99 | 119 | 133 | 27,5 | 50 | 3 | 1xØ3 | 10 | 0,085 | 0,00061 | 19 |
| **100** | 60 | 1,92 | 18.000 | 65 | 100 | 217 | 198 | 341 | 112 | 120 | 105 | 101 | 140 | 156 | 31 | 55 | 3 | 1xØ3 | 10 | 0,17 | 0,0011 | 29 |
| **115** | 70 | 3,15 | 16.000 | 75 | 115 | 242 | 224 | 376 | 122 | 135 | 120 | 106 | 160 | 178 | 38,5 | 55 | 4 | 1xØ3,5 | 13 | 0,30 | 0,0021 | 40 |
| **130** | 80 | 4,40 | 13.500 | 85 | 130 | 276 | 256 | 421 | 140 | 155 | 135 | 111 | 182 | 200 | 40,5 | 60 | 4 | 1xØ3,5 | 13 | 0,60 | 0,0034 | 61 |
| **150** | 90 | 7,00 | 11.500 | 100 | 150 | 306 | 288 | 477 | 155 | 180 | 155 | 117 | 210 | 230 | 53,5 | 60 | 4 | 2xØ3 | 20 | 1,1 | 0,0058 | 88 |
| **175** | 100 | 10,5 | 10.000 | 115 | 175 | 354 | 330 | 561 | 180 | 210 | 180 | 141 | 245 | 265 | 63 | 75 | 5 | 2xØ3 | 20 | 2,3 | 0,0099 | 139 |
| **205** | 110 | 15,8 | 9.000 | 135 | 205 | 394 | 390 | 621 | 195 | 245 | 210 | 131 | 290 | 315 | 78 | 75 | 5 | 2xØ3,5 | 26 | 4,6 | 0,018 | 214 |
| **240** | [2] – | 24,6 | 8.000 | 160 | 240 | 465 | 465 | 705 | 227 | 285 | 245 | 135 | 340 | 379 | 88 | 75 | 5 | 2xØ3,5 | 26 | 10,0 | 0,034 | 333 |
| **260** | [2] – | 31,4 | 7.000 | 175 | 260 | 510 | 510 | 780 | 237,5 | 320 | 265 | 140 | 370 | 410 | 107,5 | 90 | 6 | 2xØ4 | 36 | 16,3 | 0,047 | 455 |
| **280** | [2] – | 39,2 | 6.500 | 185 | 280 | 560 | 560 | 820 | 255 | 340 | 285 | 140 | 400 | 455 | 110 | 90 | 6 | 2xØ4 | 36 | 24,1 | 0,066 | 565 |

Subject to change due to technical improvement.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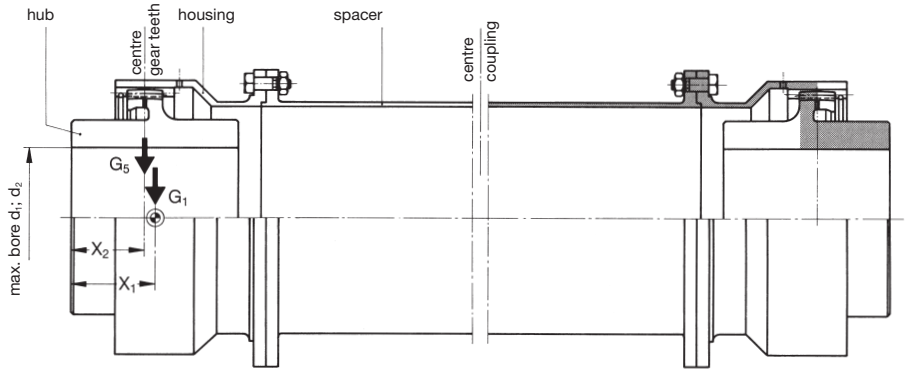
# Centres of Gravity, Torsional Spring Rates




**Determination of the centres of gravity**

Details for determining the centres of gravity

$X_1$ = Distance to centre of gravity, $G_1$

$X_2$ = Distance to weight take-up, $G_5$

$G_1$ = Weight of hub

$G_2$ = Weight of housing

$G_3$ = Weight of spacer, if $E = E_{min}$

$G_4$ = Extra weight of the spacer per 1 mm length, if $E > E_{min}$

**Determination of the torsional spring rates**

Details for determining the torsional spring rates

$C_{T1}$ = torsional spring rate of the complete coupling, if $E = E_{min}$

$C_{T2}$ = torsional spring rate per 1 mm spacer length, if $E > E_{min}$

$C_{T3}$ = torsional spring rate of the complete coupling, if $E > E_{min}$

[2]) Details based on bore $d_1$; $d_{2\ max}$

$$G_5 = G_2 + \frac{1}{2} \cdot G_3 \quad \text{if } E = E_{min}$$

or

$$G_5 = G_2 + \frac{1}{2} \cdot G_3 + \frac{1}{2} \cdot (E - E_{min}) \cdot G_4 \quad \text{if } E > E_{min}$$

$$C_{T3} = \frac{1}{\frac{1}{C_{T1}} + \frac{E - E_{min}}{C_{T2}}}$$

| Coupling Type **ZTNH + ZTKH** Size new | Size old | Weights and Centre of Gravity Distances [2]) bore $d_1$; $d_2$ max mm | $X_1$ ZTNH mm | $X_1$ ZTKH mm | $X_2$ mm | $G_1$ ZTNH kg | $G_1$ ZTKH kg | $G_2$ kg | $G_3$ kg | $G_4$ kg/mm | $G_5$ kg | Torsional Spring Rates [2]) $C_{T1}$ MNm/rad | $C_{T2}$ MNm·mm/rad | $C_{T3}$ MNm/rad |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **35** | – | 35 | 22,2 | 18,8 | 20,5 | 0,47 | 0,40 | 0,63 | 0,9 | 0,0058 | | 0,429 | 92 | |
| **40** | – | 40 | 24,3 | 20,4 | 21 | 0,61 | 0,53 | 0,77 | 1,1 | 0,0063 | | 0,540 | 115 | |
| **45** | 10 | 45 | 23,8 | 19,7 | 8,5 | 0,89 | 0,81 | 1,3 | 1,1 | 0,0058 | | 0,484 | 89 | |
| **55** | 20 | 55 | 29,1 | 24,8 | 14,5 | 1,46 | 1,29 | 1,6 | 1,2 | 0,0065 | | 0,739 | 128 | |
| **63** | 30 | 63 | 34,2 | 29,9 | 20 | 2,17 | 1,93 | 1,9 | 1,4 | 0,0075 | | 1,08 | 199 | |
| **73** | 40 | 73 | 41,5 | 35,2 | 33,5 | 3,50 | 3,03 | 2,3 | 1,6 | 0,009 | | 1,74 | 340 | |
| **85** | 50 | 85 | 50,6 | 44,4 | 45,5 | 5,40 | 4,86 | 3,1 | 1,9 | 0,012 | | 3,02 | 619 | |
| **100** | 60 | 100 | 58,8 | 52,6 | 51 | 8,46 | 7,60 | 4,2 | 3,3 | 0,018 | | 4,88 | 1162 | |
| **115** | 70 | 115 | 67,2 | 60,9 | 63 | 12,33 | 11,3 | 5,8 | 4,0 | 0,025 | | 8,20 | 2158 | |
| **130** | 80 | 130 | 76 | 67,8 | 68 | 18,83 | 16,9 | 8,7 | 6,1 | 0,031 | | 11,5 | 3421 | |
| **150** | 90 | 150 | 88,4 | 78,1 | 84,5 | 29,00 | 25,8 | 11,5 | 7,3 | 0,041 | | 18,0 | 5894 | |
| **175** | 100 | 175 | 102,7 | 90,1 | 99 | 45,40 | 40,2 | 17,5 | 13,1 | 0,054 | | 26,2 | 10056 | |
| **205** | 110 | 205 | 122,1 | 107,7 | 117 | 75,30 | 66,0 | 23,9 | 16,0 | 0,073 | | 43,6 | 17765 | |
| **240** | – | 240 | 141,6 | 126,5 | 131 | 121,0 | 126,5 | 35,8 | 19,8 | 0,094 | | 66,3 | 34269 | |
| **260** | – | 260 | 160,3 | 139,1 | 156 | 160,6 | 139,1 | 50,8 | 32,3 | 0,11 | | 85,6 | 47187 | |
| **280** | – | 280 | 169,7 | 148,6 | 161 | 202,0 | 148,6 | 62,3 | 36,4 | 0,13 | | 112,7 | 66981 | |

Calculation acc. to above equation

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Subject to change due to technical improvement.