

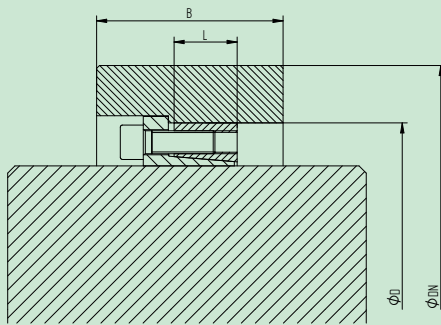
Nabenberechnung

Die K-Werte können den Tabellen direkt entnommen oder wie folgt berechnet werden:

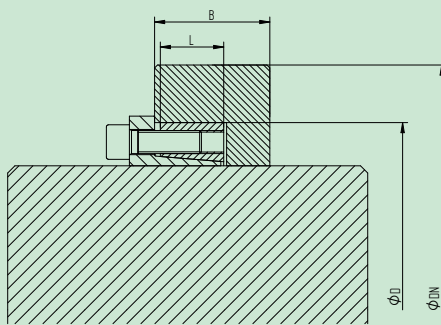
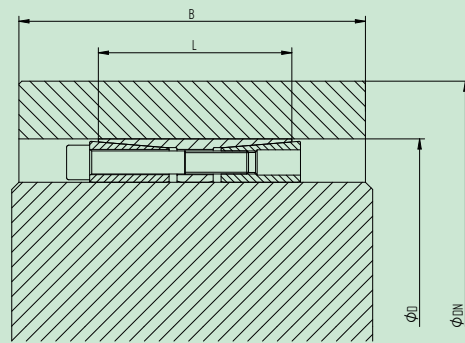
$$D_N \geq D \cdot K \quad K = \sqrt{\frac{\sigma_{02} + (C \cdot P_N)}{\sigma_{02} - (C \cdot P_N)}}$$

Bei der Anwendung von TAS Spannsätzen wird durch die Flächenpressung p_N zwischen Spannsatz und Nabe eine Spannung erzeugt. Der erforderliche Nabendurchmesser wird mit der selben Formel berechnet, wie auch dickwandige Hohlzylinder. Die realen Spannungen sind abhängig von Nabentypen und -formen im Verhältnis zu der Länge L der Spannsätze. Je nach Nabentyp ist der Faktor C für die Berechnung zu berücksichtigen.

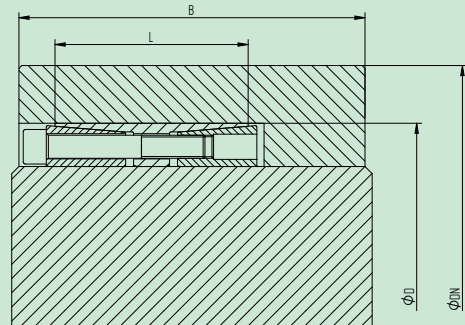
$B \geq 2L$



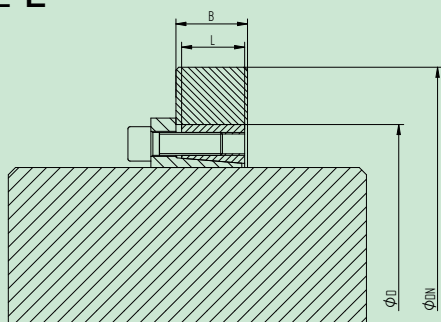
$C = 0,6$



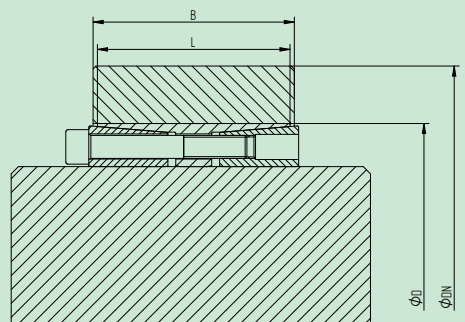
$C = 0,8$



$B \geq L$



$C = 1,0$



Nabenaußendurchmesser

K-Faktoren für Nabentyp mit C = 0,6

| p_N N/mm ² | Streckgrenze Nabenmaterial (N/mm ²) | | | | | | | | | | |
|----------------------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 150 | 180 | 210 | 240 | 270 | 300 | 330 | 360 | 390 | 420 | 450 |
| 50 | 1,225 | 1,184 | 1,155 | 1,134 | 1,119 | 1,106 | 1,096 | 1,088 | 1,081 | 1,075 | 1,070 |
| 55 | 1,251 | 1,204 | 1,172 | 1,149 | 1,131 | 1,117 | 1,106 | 1,097 | 1,089 | 1,082 | 1,077 |
| 60 | 1,278 | 1,225 | 1,190 | 1,164 | 1,144 | 1,129 | 1,116 | 1,106 | 1,097 | 1,090 | 1,084 |
| 65 | 1,305 | 1,247 | 1,207 | 1,179 | 1,157 | 1,140 | 1,127 | 1,115 | 1,106 | 1,098 | 1,091 |
| 70 | 1,334 | 1,269 | 1,225 | 1,194 | 1,170 | 1,152 | 1,137 | 1,125 | 1,115 | 1,106 | 1,099 |
| 75 | 1,363 | 1,291 | 1,244 | 1,209 | 1,184 | 1,164 | 1,148 | 1,134 | 1,123 | 1,114 | 1,106 |
| 80 | 1,394 | 1,315 | 1,262 | 1,225 | 1,197 | 1,176 | 1,158 | 1,144 | 1,132 | 1,122 | 1,114 |
| 85 | 1,425 | 1,339 | 1,282 | 1,241 | 1,211 | 1,188 | 1,169 | 1,154 | 1,141 | 1,130 | 1,121 |
| 90 | 1,458 | 1,363 | 1,301 | 1,258 | 1,225 | 1,200 | 1,180 | 1,164 | 1,150 | 1,139 | 1,129 |
| 95 | 1,492 | 1,389 | 1,322 | 1,274 | 1,240 | 1,213 | 1,191 | 1,174 | 1,159 | 1,147 | 1,136 |
| 100 | 1,528 | 1,415 | 1,342 | 1,291 | 1,254 | 1,225 | 1,202 | 1,184 | 1,168 | 1,155 | 1,144 |
| 105 | 1,565 | 1,442 | 1,363 | 1,309 | 1,269 | 1,238 | 1,214 | 1,194 | 1,177 | 1,164 | 1,152 |
| 110 | 1,604 | 1,469 | 1,385 | 1,327 | 1,284 | 1,251 | 1,225 | 1,204 | 1,187 | 1,172 | 1,160 |
| 115 | 1,645 | 1,498 | 1,407 | 1,345 | 1,299 | 1,264 | 1,237 | 1,215 | 1,196 | 1,181 | 1,168 |
| 120 | 1,688 | 1,528 | 1,430 | 1,363 | 1,315 | 1,278 | 1,249 | 1,225 | 1,206 | 1,190 | 1,176 |
| 125 | 1,733 | 1,559 | 1,453 | 1,382 | 1,331 | 1,291 | 1,261 | 1,236 | 1,215 | 1,198 | 1,184 |
| 130 | 1,780 | 1,591 | 1,478 | 1,402 | 1,347 | 1,305 | 1,273 | 1,247 | 1,225 | 1,207 | 1,192 |
| 135 | 1,830 | 1,624 | 1,502 | 1,421 | 1,363 | 1,319 | 1,285 | 1,258 | 1,235 | 1,216 | 1,200 |
| 140 | 1,883 | 1,659 | 1,528 | 1,442 | 1,380 | 1,334 | 1,298 | 1,269 | 1,245 | 1,225 | 1,208 |
| 145 | 1,940 | 1,695 | 1,554 | 1,462 | 1,397 | 1,348 | 1,310 | 1,280 | 1,255 | 1,234 | 1,217 |
| 150 | - | 1,733 | 1,582 | 1,484 | 1,415 | 1,363 | 1,323 | 1,291 | 1,265 | 1,244 | 1,225 |
| 155 | - | 1,772 | 1,610 | 1,506 | 1,433 | 1,378 | 1,336 | 1,303 | 1,276 | 1,253 | 1,234 |
| 160 | - | 1,813 | 1,639 | 1,528 | 1,451 | 1,394 | 1,350 | 1,315 | 1,286 | 1,262 | 1,242 |
| 165 | - | 1,856 | 1,669 | 1,551 | 1,469 | 1,409 | 1,363 | 1,327 | 1,297 | 1,272 | 1,251 |
| 170 | - | 1,902 | 1,700 | 1,575 | 1,489 | 1,425 | 1,377 | 1,339 | 1,308 | 1,282 | 1,260 |
| 175 | - | 1,950 | 1,733 | 1,599 | 1,508 | 1,442 | 1,391 | 1,351 | 1,318 | 1,291 | 1,269 |
| 180 | - | - | 1,766 | 1,624 | 1,528 | 1,458 | 1,405 | 1,363 | 1,329 | 1,301 | 1,278 |
| 185 | - | - | 1,801 | 1,650 | 1,548 | 1,475 | 1,420 | 1,376 | 1,341 | 1,311 | 1,287 |
| 190 | - | - | 1,838 | 1,677 | 1,569 | 1,492 | 1,434 | 1,389 | 1,352 | 1,322 | 1,296 |
| 195 | - | - | 1,876 | 1,704 | 1,591 | 1,510 | 1,449 | 1,402 | 1,363 | 1,332 | 1,305 |
| 200 | - | - | 1,915 | 1,733 | 1,613 | 1,528 | 1,464 | 1,415 | 1,375 | 1,342 | 1,315 |
| 205 | - | - | 1,957 | 1,762 | 1,636 | 1,546 | 1,480 | 1,428 | 1,387 | 1,353 | 1,324 |
| 210 | - | - | - | 1,792 | 1,659 | 1,565 | 1,496 | 1,442 | 1,399 | 1,363 | 1,334 |
| 215 | - | - | - | 1,824 | 1,683 | 1,584 | 1,512 | 1,455 | 1,411 | 1,374 | 1,344 |
| 220 | - | - | - | 1,856 | 1,707 | 1,604 | 1,528 | 1,469 | 1,423 | 1,385 | 1,353 |
| 225 | - | - | - | 1,890 | 1,733 | 1,624 | 1,545 | 1,484 | 1,435 | 1,396 | 1,363 |
| 230 | - | - | - | 1,926 | 1,759 | 1,645 | 1,562 | 1,498 | 1,448 | 1,407 | 1,373 |
| 235 | - | - | - | 1,962 | 1,785 | 1,666 | 1,579 | 1,513 | 1,461 | 1,419 | 1,383 |
| 240 | - | - | - | - | 1,813 | 1,688 | 1,597 | 1,528 | 1,474 | 1,430 | 1,394 |
| 245 | - | - | - | - | 1,842 | 1,710 | 1,615 | 1,543 | 1,487 | 1,442 | 1,404 |
| 250 | - | - | - | - | 1,871 | 1,733 | 1,633 | 1,559 | 1,500 | 1,453 | 1,415 |

Nabenaußendurchmesser

K-Faktoren für Nabentyp mit C = 0,8

| p_N | Streckgrenze Nabenmaterial (N/mm ²) | | | | | | | | | | |
|-------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 150 | 180 | 210 | 240 | 270 | 300 | 330 | 360 | 390 | 420 | 450 |
| 50 | 1,315 | 1,254 | 1,213 | 1,184 | 1,161 | 1,144 | 1,130 | 1,119 | 1,109 | 1,101 | 1,094 |
| 55 | 1,353 | 1,284 | 1,237 | 1,204 | 1,179 | 1,160 | 1,144 | 1,131 | 1,120 | 1,111 | 1,104 |
| 60 | 1,394 | 1,315 | 1,262 | 1,225 | 1,197 | 1,176 | 1,158 | 1,144 | 1,132 | 1,122 | 1,114 |
| 65 | 1,436 | 1,347 | 1,288 | 1,247 | 1,216 | 1,192 | 1,173 | 1,157 | 1,144 | 1,133 | 1,124 |
| 70 | 1,481 | 1,380 | 1,315 | 1,269 | 1,235 | 1,208 | 1,187 | 1,170 | 1,156 | 1,144 | 1,134 |
| 75 | 1,528 | 1,415 | 1,342 | 1,291 | 1,254 | 1,225 | 1,202 | 1,184 | 1,168 | 1,155 | 1,144 |
| 80 | 1,578 | 1,451 | 1,370 | 1,315 | 1,274 | 1,242 | 1,218 | 1,197 | 1,181 | 1,166 | 1,154 |
| 85 | 1,631 | 1,489 | 1,400 | 1,339 | 1,294 | 1,260 | 1,233 | 1,211 | 1,193 | 1,178 | 1,165 |
| 90 | 1,688 | 1,528 | 1,430 | 1,363 | 1,315 | 1,278 | 1,249 | 1,225 | 1,206 | 1,190 | 1,176 |
| 95 | 1,748 | 1,569 | 1,461 | 1,389 | 1,336 | 1,296 | 1,265 | 1,240 | 1,219 | 1,201 | 1,186 |
| 100 | 1,813 | 1,613 | 1,494 | 1,415 | 1,358 | 1,315 | 1,281 | 1,254 | 1,232 | 1,213 | 1,197 |
| 105 | 1,883 | 1,659 | 1,528 | 1,442 | 1,380 | 1,334 | 1,298 | 1,269 | 1,245 | 1,225 | 1,208 |
| 110 | 1,960 | 1,707 | 1,563 | 1,469 | 1,403 | 1,353 | 1,315 | 1,284 | 1,259 | 1,237 | 1,220 |
| 115 | 2,043 | 1,759 | 1,600 | 1,498 | 1,427 | 1,373 | 1,332 | 1,299 | 1,272 | 1,250 | 1,231 |
| 120 | 2,135 | 1,813 | 1,639 | 1,528 | 1,451 | 1,394 | 1,350 | 1,315 | 1,286 | 1,262 | 1,242 |
| 125 | 2,237 | 1,871 | 1,679 | 1,559 | 1,476 | 1,415 | 1,368 | 1,331 | 1,300 | 1,275 | 1,254 |
| 130 | 2,350 | 1,934 | 1,722 | 1,591 | 1,502 | 1,436 | 1,386 | 1,347 | 1,315 | 1,288 | 1,266 |
| 135 | 2,479 | 2,000 | 1,766 | 1,624 | 1,528 | 1,458 | 1,405 | 1,363 | 1,329 | 1,301 | 1,278 |
| 140 | 2,626 | 2,073 | 1,813 | 1,659 | 1,555 | 1,481 | 1,424 | 1,380 | 1,344 | 1,315 | 1,290 |
| 145 | 2,798 | 2,151 | 1,863 | 1,695 | 1,584 | 1,504 | 1,444 | 1,397 | 1,359 | 1,328 | 1,302 |
| 150 | - | 2,237 | 1,915 | 1,733 | 1,613 | 1,528 | 1,464 | 1,415 | 1,375 | 1,342 | 1,315 |
| 155 | - | 2,330 | 1,971 | 1,772 | 1,643 | 1,553 | 1,485 | 1,433 | 1,391 | 1,356 | 1,327 |
| 160 | - | 2,434 | 2,031 | 1,813 | 1,675 | 1,578 | 1,506 | 1,451 | 1,407 | 1,370 | 1,340 |
| 165 | - | 2,550 | 2,094 | 1,856 | 1,707 | 1,604 | 1,528 | 1,469 | 1,423 | 1,385 | 1,353 |
| 170 | - | 2,680 | 2,163 | 1,902 | 1,741 | 1,631 | 1,550 | 1,489 | 1,440 | 1,400 | 1,367 |
| 175 | - | 2,829 | 2,237 | 1,950 | 1,776 | 1,659 | 1,573 | 1,508 | 1,457 | 1,415 | 1,380 |
| 180 | - | - | 2,316 | 2,000 | 1,813 | 1,688 | 1,597 | 1,528 | 1,474 | 1,430 | 1,394 |
| 185 | - | - | 2,403 | 2,054 | 1,852 | 1,717 | 1,621 | 1,548 | 1,492 | 1,446 | 1,408 |
| 190 | - | - | 2,499 | 2,111 | 1,892 | 1,748 | 1,646 | 1,569 | 1,510 | 1,461 | 1,422 |
| 195 | - | - | 2,604 | 2,172 | 1,934 | 1,780 | 1,672 | 1,591 | 1,528 | 1,478 | 1,436 |
| 200 | - | - | 2,721 | 2,237 | 1,978 | 1,813 | 1,698 | 1,613 | 1,547 | 1,494 | 1,451 |
| 205 | - | - | 2,852 | 2,306 | 2,024 | 1,848 | 1,726 | 1,636 | 1,566 | 1,511 | 1,466 |
| 210 | - | - | - | 2,381 | 2,073 | 1,883 | 1,754 | 1,659 | 1,586 | 1,528 | 1,481 |
| 215 | - | - | - | 2,462 | 2,124 | 1,921 | 1,783 | 1,683 | 1,606 | 1,546 | 1,496 |
| 220 | - | - | - | 2,550 | 2,179 | 1,960 | 1,813 | 1,707 | 1,627 | 1,563 | 1,512 |
| 225 | - | - | - | 2,646 | 2,237 | 2,000 | 1,844 | 1,733 | 1,648 | 1,582 | 1,528 |
| 230 | - | - | - | 2,752 | 2,298 | 2,043 | 1,877 | 1,759 | 1,670 | 1,600 | 1,544 |
| 235 | - | - | - | 2,869 | 2,364 | 2,088 | 1,910 | 1,785 | 1,692 | 1,619 | 1,561 |
| 240 | - | - | - | - | 2,434 | 2,135 | 1,945 | 1,813 | 1,715 | 1,639 | 1,578 |
| 245 | - | - | - | - | 2,510 | 2,184 | 1,982 | 1,842 | 1,738 | 1,659 | 1,595 |
| 250 | - | - | - | - | 2,592 | 2,237 | 2,020 | 1,871 | 1,763 | 1,679 | 1,613 |

Nabenaußendurchmesser

K-Faktoren für Nabentyp mit C = 1,0

| p_N N/mm ² | Streckgrenze Nabenmaterial (N/mm ²) | | | | | | | | | | |
|----------------------------|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 150 | 180 | 210 | 240 | 270 | 300 | 330 | 360 | 390 | 420 | 450 |
| 50 | 1,415 | 1,331 | 1,275 | 1,236 | 1,207 | 1,184 | 1,165 | 1,151 | 1,138 | 1,128 | 1,119 |
| 55 | 1,469 | 1,372 | 1,308 | 1,263 | 1,230 | 1,204 | 1,184 | 1,167 | 1,153 | 1,141 | 1,131 |
| 60 | 1,528 | 1,415 | 1,342 | 1,291 | 1,254 | 1,225 | 1,202 | 1,184 | 1,168 | 1,155 | 1,144 |
| 65 | 1,591 | 1,460 | 1,378 | 1,321 | 1,279 | 1,247 | 1,221 | 1,201 | 1,184 | 1,169 | 1,157 |
| 70 | 1,659 | 1,508 | 1,415 | 1,351 | 1,304 | 1,269 | 1,241 | 1,218 | 1,199 | 1,184 | 1,170 |
| 75 | 1,733 | 1,559 | 1,453 | 1,382 | 1,331 | 1,291 | 1,261 | 1,236 | 1,215 | 1,198 | 1,184 |
| 80 | 1,813 | 1,613 | 1,494 | 1,415 | 1,358 | 1,315 | 1,281 | 1,254 | 1,232 | 1,213 | 1,197 |
| 85 | 1,902 | 1,671 | 1,537 | 1,449 | 1,386 | 1,339 | 1,302 | 1,273 | 1,248 | 1,228 | 1,211 |
| 90 | 2,000 | 1,733 | 1,582 | 1,484 | 1,415 | 1,363 | 1,323 | 1,291 | 1,265 | 1,244 | 1,225 |
| 95 | 2,111 | 1,799 | 1,629 | 1,520 | 1,445 | 1,389 | 1,345 | 1,311 | 1,283 | 1,259 | 1,240 |
| 100 | 2,237 | 1,871 | 1,679 | 1,559 | 1,476 | 1,415 | 1,368 | 1,331 | 1,300 | 1,275 | 1,254 |
| 105 | 2,381 | 1,950 | 1,733 | 1,599 | 1,508 | 1,442 | 1,391 | 1,351 | 1,318 | 1,291 | 1,269 |
| 110 | 2,550 | 2,036 | 1,789 | 1,641 | 1,542 | 1,469 | 1,415 | 1,372 | 1,337 | 1,308 | 1,284 |
| 115 | 2,752 | 2,131 | 1,850 | 1,686 | 1,577 | 1,498 | 1,439 | 1,393 | 1,356 | 1,325 | 1,299 |
| 120 | 3,000 | 2,237 | 1,915 | 1,733 | 1,613 | 1,528 | 1,464 | 1,415 | 1,375 | 1,342 | 1,315 |
| 125 | 3,317 | 2,355 | 1,986 | 1,782 | 1,651 | 1,559 | 1,490 | 1,437 | 1,395 | 1,360 | 1,331 |
| 130 | 3,742 | 2,490 | 2,062 | 1,835 | 1,691 | 1,591 | 1,517 | 1,460 | 1,415 | 1,378 | 1,347 |
| 135 | 4,359 | 2,646 | 2,145 | 1,890 | 1,733 | 1,624 | 1,545 | 1,484 | 1,435 | 1,396 | 1,363 |
| 140 | 5,386 | 2,829 | 2,237 | 1,950 | 1,776 | 1,659 | 1,573 | 1,508 | 1,457 | 1,415 | 1,380 |
| 145 | 7,682 | 3,048 | 2,337 | 2,014 | 1,823 | 1,695 | 1,603 | 1,533 | 1,478 | 1,434 | 1,397 |
| 150 | - | 3,317 | 2,450 | 2,082 | 1,871 | 1,733 | 1,633 | 1,559 | 1,500 | 1,453 | 1,415 |
| 155 | - | 3,661 | 2,577 | 2,156 | 1,923 | 1,772 | 1,665 | 1,585 | 1,523 | 1,474 | 1,433 |
| 160 | - | 4,124 | 2,721 | 2,237 | 1,978 | 1,813 | 1,698 | 1,613 | 1,547 | 1,494 | 1,451 |
| 165 | - | 4,796 | 2,887 | 2,324 | 2,036 | 1,856 | 1,733 | 1,641 | 1,571 | 1,515 | 1,469 |
| 170 | - | 5,917 | 3,083 | 2,421 | 2,098 | 1,902 | 1,768 | 1,671 | 1,596 | 1,537 | 1,489 |
| 175 | - | 8,427 | 3,317 | 2,527 | 2,165 | 1,950 | 1,806 | 1,701 | 1,622 | 1,559 | 1,508 |
| 180 | - | - | 3,606 | 2,646 | 2,237 | 2,000 | 1,844 | 1,733 | 1,648 | 1,582 | 1,528 |
| 185 | - | - | 3,975 | 2,780 | 2,314 | 2,054 | 1,885 | 1,765 | 1,675 | 1,605 | 1,548 |
| 190 | - | - | 4,473 | 2,933 | 2,398 | 2,111 | 1,928 | 1,799 | 1,703 | 1,629 | 1,569 |
| 195 | - | - | 5,197 | 3,110 | 2,490 | 2,172 | 1,973 | 1,835 | 1,733 | 1,654 | 1,591 |
| 200 | - | - | 6,404 | 3,317 | 2,592 | 2,237 | 2,020 | 1,871 | 1,763 | 1,679 | 1,613 |
| 205 | - | - | 9,111 | 3,566 | 2,704 | 2,306 | 2,069 | 1,910 | 1,794 | 1,705 | 1,636 |
| 210 | - | - | - | 3,873 | 2,829 | 2,381 | 2,122 | 1,950 | 1,826 | 1,733 | 1,659 |
| 215 | - | - | - | 4,267 | 2,970 | 2,462 | 2,177 | 1,992 | 1,860 | 1,760 | 1,683 |
| 220 | - | - | - | 4,796 | 3,131 | 2,550 | 2,237 | 2,036 | 1,895 | 1,789 | 1,707 |
| 225 | - | - | - | 5,568 | 3,317 | 2,646 | 2,300 | 2,082 | 1,931 | 1,819 | 1,733 |
| 230 | - | - | - | 6,856 | 3,536 | 2,752 | 2,367 | 2,131 | 1,969 | 1,850 | 1,759 |
| 235 | - | - | - | 9,747 | 3,799 | 2,869 | 2,439 | 2,182 | 2,009 | 1,882 | 1,785 |
| 240 | - | - | - | - | 4,124 | 3,000 | 2,517 | 2,237 | 2,050 | 1,915 | 1,813 |
| 245 | - | - | - | - | 4,539 | 3,148 | 2,601 | 2,294 | 2,093 | 1,950 | 1,842 |
| 250 | - | - | - | - | 5,100 | 3,317 | 2,693 | 2,355 | 2,139 | 1,986 | 1,871 |