

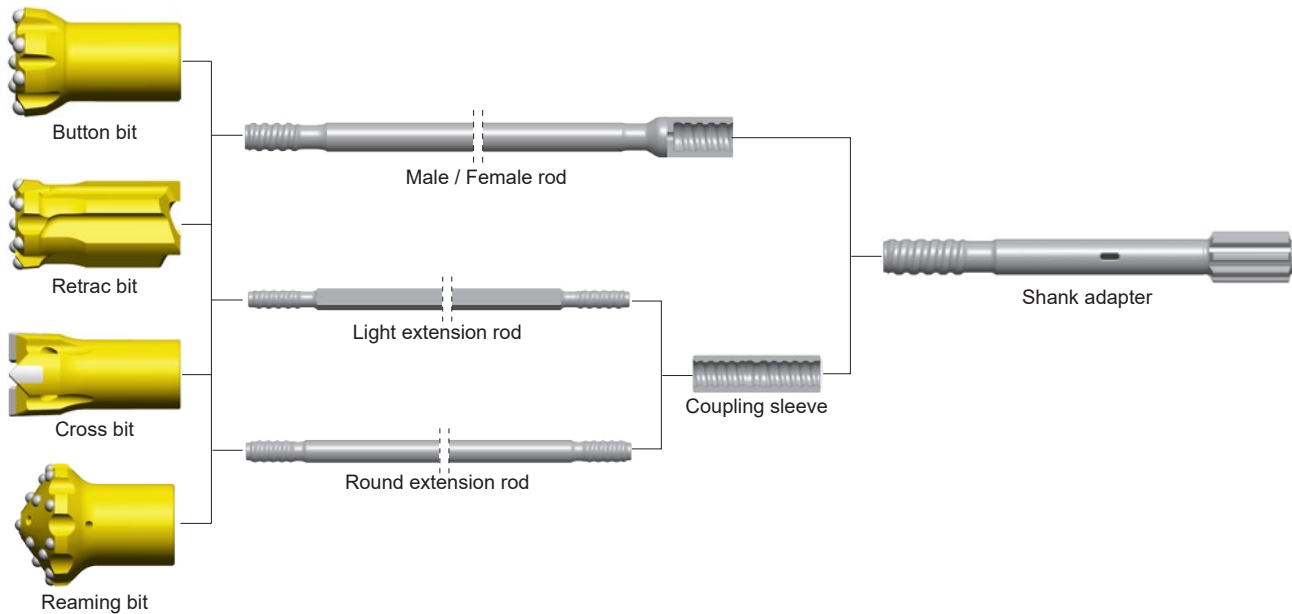
# BENCH & LONGHOLE DRILLING EQUIPMENT





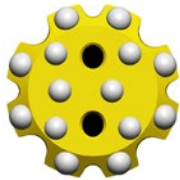
# BENCH & LONG HOLE DRILLING EQUIPMENT

## T38 (1 1/2") SERIES (Recommended gauge diameter Ø64 - Ø102)



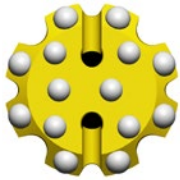
Standard item list - CUSTOM BUTTONS AND FLUSHING CONFIGURATIONS ARE AVAILABLE UPON REQUEST  
For details of bit design, please refer to p.16

### Button bit Type 15



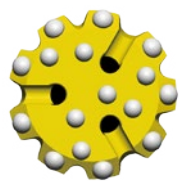
| Gauge diameter |        | Gauge angle [°] | Button × Button dia.[mm] |      | Flushing hole |      | Weight [Kg] | Part number   |
|----------------|--------|-----------------|--------------------------|------|---------------|------|-------------|---------------|
| [mm]           | [in]   |                 | Gauge                    | Face | Side          | Face |             |               |
| 64             | 2 1/2" | 35              | 8×11                     | 4×10 | -             | 2    | 1.6         | 38MPVS64R15M  |
| 64             | 2 1/2" | 40              | 8×10                     | 5×10 | -             | 2    | 1.6         | 38MPVS64R15H  |
| 70             | 2 3/4" | 35              | 8×11                     | 4×11 | -             | 2    | 1.9         | 38MPVS70R15M  |
| 70             | 2 3/4" | 40              | 8×11                     | 5×10 | -             | 2    | 1.9         | 38MPVS70R15H  |
| 76             | 3"     | 35              | 8×12                     | 4×11 | -             | 2    | 2.2         | 38MPVS76R15M  |
| 76             | 3"     | 40              | 8×11                     | 5×11 | -             | 2    | 2.2         | 38MPVS76R15H  |
| 89             | 3 1/2" | 35              | 8×13                     | 6×12 | -             | 2    | 3.4         | 38MPVS89R15M  |
| 89             | 3 1/2" | 40              | 8×12                     | 6×12 | -             | 2    | 3.4         | 38MPVS89R15H  |
| 102            | 4"     | 35              | 8×14                     | 6×13 | -             | 2    | 4.5         | 38MPVS102R15M |
| 102            | 4"     | 40              | 8×13                     | 6×13 | -             | 2    | 4.5         | 38MPVS102R15H |

### Button bit Type 25



| Gauge diameter |        | Gauge angle [°] | Button × Button dia.[mm] |      | Flushing hole |      | Weight [Kg] | Part number   |
|----------------|--------|-----------------|--------------------------|------|---------------|------|-------------|---------------|
| [mm]           | [in]   |                 | Gauge                    | Face | Side          | Face |             |               |
| 89             | 3 1/2" | 35              | 8×13                     | 6×12 | -             | 2    | 3.3         | 38MPVS89R25M  |
| 102            | 4"     | 35              | 8×14                     | 6×13 | -             | 2    | 4.4         | 38MPVS102R25M |

### Button bit Type 23



| Gauge diameter |        | Gauge angle [°] | Button × Button dia.[mm] |      | Flushing hole |      | Weight [Kg] | Part number   |
|----------------|--------|-----------------|--------------------------|------|---------------|------|-------------|---------------|
| [mm]           | [in]   |                 | Gauge                    | Face | Side          | Face |             |               |
| 89             | 3 1/2" | 35              | 9×12                     | 6×12 | -             | 3    | 3.4         | 38MPVS89R23M  |
| 102            | 4"     | 35              | 9×13                     | 6×13 | -             | 3    | 4.5         | 38MPVS102R23M |

## Button bit Type 53 & 55



Type 53 (Ø64-Ø89)



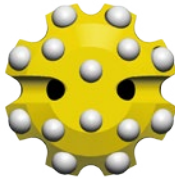
Type 55 (Ø76-Ø102)

| Gauge diameter |        | Gauge angle [°] | Button × Button dia.[mm] |      | Flushing hole |      | Weight [Kg] | Part number          |
|----------------|--------|-----------------|--------------------------|------|---------------|------|-------------|----------------------|
| [mm]           | [in]   |                 | Gauge                    | Face | Side          | Face |             |                      |
| 64             | 2 1/2" | 35              | 6×10                     | 4×10 | -             | 3    | 1.6         | <b>38MPVS64R53M</b>  |
| 70             | 2 3/4" | 35              | 6×11                     | 4×11 | -             | 3    | 1.8         | <b>38MPVS70R53M</b>  |
| 76             | 3"     | 35              | 6×12                     | 4×11 | -             | 3    | 2.1         | <b>38MPVS76R53M</b>  |
| 76             | 3"     | 35              | 8×11                     | 5×11 | -             | 4    | 2.2         | <b>38MPVS76R55M</b>  |
| 89             | 3 1/2" | 35              | 6×13                     | 5×12 | -             | 3    | 3.3         | <b>38MPVS89R53M</b>  |
| 89             | 3 1/2" | 35              | 8×12                     | 6×12 | -             | 4    | 3.4         | <b>38MPVS89R55M</b>  |
| 102            | 4"     | 35              | 8×14                     | 6×14 | -             | 4    | 4.4         | <b>38MPVS102R55M</b> |

## Button bit Type 83 & 85



Type 83 (Ø64-Ø76)



Type 85 (Ø76-Ø102)

| Gauge diameter |        | * Gauge angle [°] | Button × Button dia.[mm] |            | Flushing hole |      | Weight [Kg] | Part number           |
|----------------|--------|-------------------|--------------------------|------------|---------------|------|-------------|-----------------------|
| [mm]           | [in]   |                   | Gauge                    | Face       | Side          | Face |             |                       |
| 64             | 2 1/2" | 20-40             | 6×10                     | 3×10, 2×9  | 1             | 1    | 1.6         | <b>38MPWS64BB83H</b>  |
| 70             | 2 3/4" | 20-40             | 6×11                     | 5×10       | 1             | 1    | 1.8         | <b>38MPWS70BB83H</b>  |
| 76             | 3"     | 20-40             | 6×11                     | 3×11, 2×10 | 1             | 1    | 2.1         | <b>38MPWS76BB83H</b>  |
| 76             | 3"     | 20-40             | 8×11                     | 6×10       | 2             | 2    | 2.2         | <b>38MPWS76BB85H</b>  |
| 89             | 3 1/2" | 20-40             | 8×12                     | 6×12       | 2             | 2    | 3.4         | <b>38MPWS89BB85H</b>  |
| 102            | 4"     | 20-40             | 8×12                     | 7×12       | -             | 2    | 4.4         | <b>38MPVS102BB85H</b> |

\* Face angle 20°, Gauge angle 40°

## Button bit Type 14



| Gauge diameter |        | Gauge angle [°] | Button × Button dia.[mm] |      | Flushing hole |      | Weight [Kg] | Part number          |
|----------------|--------|-----------------|--------------------------|------|---------------|------|-------------|----------------------|
| [mm]           | [in]   |                 | Gauge                    | Face | Side          | Face |             |                      |
| 64             | 2 1/2" | 35              | 7×11                     | 4×10 | -             | 3    | 1.6         | <b>38MPVS64R14M</b>  |
| 70             | 2 3/4" | 35              | 7×11                     | 4×11 | -             | 3    | 1.8         | <b>38MPVS70R14M</b>  |
| 76             | 3"     | 35              | 7×12                     | 4×11 | -             | 3    | 2.2         | <b>38MPVS76R14M</b>  |
| 89             | 3 1/2" | 35              | 7×14                     | 5×12 | -             | 3    | 3.4         | <b>38MPVS89R14M</b>  |
| 102            | 4"     | 35              | 7×14                     | 5×13 | -             | 3    | 4.4         | <b>38MPVS102R14M</b> |

## Cross bit

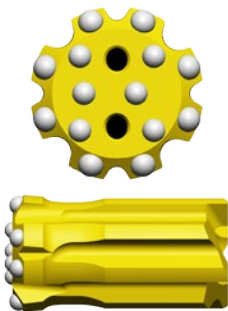


| Gauge diameter |        | Carbide size<br>W × H [mm] | Button × Button dia.[mm] |      | Flushing hole |      | Weight [Kg] | Part number     |
|----------------|--------|----------------------------|--------------------------|------|---------------|------|-------------|-----------------|
| [mm]           | [in]   |                            | Gauge                    | Face | Side          | Face |             |                 |
| 64             | 2 1/2" | 13×22                      | -                        | -    | 4             | 1    | 1.8         | <b>38MX64S</b>  |
| 76             | 3"     | 13×22                      | -                        | -    | 4             | 1    | 2.4         | <b>38MX76S2</b> |

# BENCH & LONG HOLE DRILLING EQUIPMENT

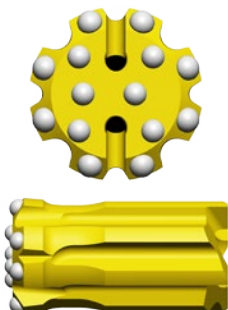
## T38 (1 1/2") SERIES (Recommended gauge diameter Ø64 - Ø102)

### Retrac Button bit Type 15



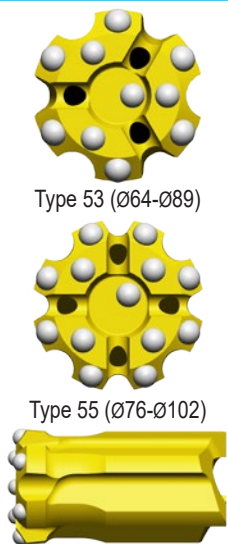
| Gauge diameter |        | Gauge angle [°] | Button × Button dia.[mm] |      | Flushing hole |      | Weight [Kg] | Part number   |
|----------------|--------|-----------------|--------------------------|------|---------------|------|-------------|---------------|
| [mm]           | [in]   |                 | Gauge                    | Face | Side          | Face |             |               |
| 64             | 2 1/2" | 35              | 8×11                     | 4×10 | -             | 2    | 2.1         | 38MPVR64R15M  |
| 70             | 2 3/4" | 35              | 8×11                     | 4×11 | -             | 2    | 2.6         | 38MPVR70R15M  |
| 76             | 3"     | 35              | 8×12                     | 4×11 | -             | 2    | 3.1         | 38MPVR76R15M  |
| 89             | 3 1/2" | 35              | 8×13                     | 6×12 | -             | 2    | 4.4         | 38MPVR89R15M  |
| 102            | 4"     | 35              | 8×14                     | 6×13 | -             | 2    | 6.6         | 38MPVR102R15M |

### Retrac Button bit Type 25



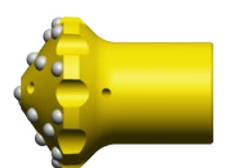
| Gauge diameter |        | Gauge angle [°] | Button × Button dia.[mm] |      | Flushing hole |      | Weight [Kg] | Part number   |
|----------------|--------|-----------------|--------------------------|------|---------------|------|-------------|---------------|
| [mm]           | [in]   |                 | Gauge                    | Face | Side          | Face |             |               |
| 89             | 3 1/2" | 35              | 8×13                     | 6×12 | -             | 2    | 4.4         | 38MPVR89R25M  |
| 102            | 4"     | 35              | 8×14                     | 6×13 | -             | 2    | 6.5         | 38MPVR102R25M |

### Retrac Button bit Type 53 & 55



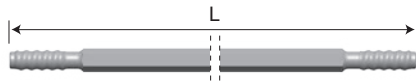
| Gauge diameter |        | Gauge angle [°] | Button × Button dia.[mm] |      | Flushing hole |      | Weight [Kg] | Part number   |
|----------------|--------|-----------------|--------------------------|------|---------------|------|-------------|---------------|
| [mm]           | [in]   |                 | Gauge                    | Face | Side          | Face |             |               |
| 64             | 2 1/2" | 35              | 6×10                     | 4×10 | -             | 3    | 2.0         | 38MPVR64R53M  |
| 70             | 2 3/4" | 35              | 6×11                     | 4×11 | -             | 3    | 2.5         | 38MPVR70R53M  |
| 76             | 3"     | 35              | 6×12                     | 4×11 | -             | 3    | 2.9         | 38MPVR76R53M  |
| 76             | 3"     | 35              | 8×11                     | 5×11 | -             | 4    | 3.0         | 38MPVR76R55M  |
| 89             | 3 1/2" | 35              | 6×13                     | 5×12 | -             | 3    | 4.3         | 38MPVR89R53M  |
| 89             | 3 1/2" | 35              | 8×12                     | 6×12 | -             | 4    | 4.4         | 38MPVR89R55M  |
| 102            | 4"     | 35              | 8×14                     | 6×14 | -             | 4    | 6.5         | 38MPVR102R55M |

### Reaming bit integration model



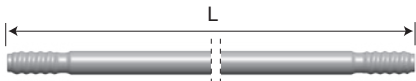
| Gauge diameter |      | Gauge angle [°] | Button × Button dia.[mm] |       | Flushing hole |      | Weight [Kg] | Part number   |
|----------------|------|-----------------|--------------------------|-------|---------------|------|-------------|---------------|
| [mm]           | [in] |                 | Gauge                    | Face  | Side          | Face |             |               |
| 127            | 5"   | 35              | 9×13                     | 10×13 | 3             | 1    | 7.5         | WI38MPJ127R-D |
| 152            | 6"   | 35              | 9×14                     | 11×14 | 3             | 1    | 10.5        | WI38MPJ152R-D |

### Light extension rod



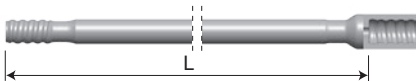
| Thread    | Hex  |        | Length(L) |         | Weight<br>[Kg] | Part number         |
|-----------|------|--------|-----------|---------|----------------|---------------------|
|           | [mm] | [in]   | [mm]      | [ft/in] |                |                     |
| T38 - T38 | 32   | 1 1/4" | 3050      | 10'     | 18.4           | <b>EH32M38-3050</b> |
|           |      |        | 3660      | 12'     | 22.1           | <b>EH32M38-3660</b> |

### Round extension rod



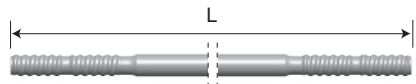
| Thread    | Outside diameter |        | Length(L) |         | Weight<br>[Kg] | Part number         |
|-----------|------------------|--------|-----------|---------|----------------|---------------------|
|           | [mm]             | [in]   | [mm]      | [ft/in] |                |                     |
| T38 - T38 | 38               | 1 1/2" | 3050      | 10'     | 24.7           | <b>ER38M38-3050</b> |
|           |                  |        | 3660      | 12'     | 29.4           | <b>ER38M38-3660</b> |
|           |                  |        | 4270      | 14'     | 34.7           | <b>ER38M38-4270</b> |
|           |                  |        | 4880      | 16'     | 39.7           | <b>ER38M38-4880</b> |
|           |                  |        | 5490      | 18'     | 44.6           | <b>ER38M38-5490</b> |

### Male / Female rod



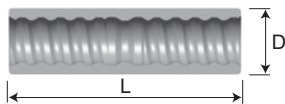
| Thread    | Outside diameter |        | Length(L) |         | Weight<br>[Kg] | Part number           |
|-----------|------------------|--------|-----------|---------|----------------|-----------------------|
|           | [mm]             | [in]   | [mm]      | [ft/in] |                |                       |
| T38 - T38 | 38               | 1 1/2" | 900       | 3'      | 8.0            | <b>ER38M38MF-900</b>  |
|           |                  |        | 1220      | 4'      | 9.7            | <b>ER38M38MF-1220</b> |
|           |                  |        | 1525      | 5'      | 13.3           | <b>ER38M38MF-1525</b> |
|           |                  |        | 1830      | 6'      | 16.0           | <b>ER38M38MF-1830</b> |
|           |                  |        | 2440      | 8'      | 21.3           | <b>ER38M38MF-2440</b> |
|           |                  |        | 3050      | 10'     | 25.9           | <b>ER38M38MF-3050</b> |
|           |                  |        | 3660      | 12'     | 30.7           | <b>ER38M38MF-3660</b> |

### Tandem rod



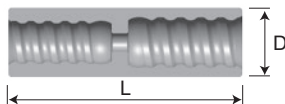
| Thread    | Outside diameter |        | Length(L) |         | Weight<br>[Kg] | Part number          |
|-----------|------------------|--------|-----------|---------|----------------|----------------------|
|           | [mm]             | [in]   | [mm]      | [ft/in] |                |                      |
| T38 - T38 | 38               | 1 1/2" | 3050      | 10'     | 24.4           | <b>ER38M38T-3050</b> |
|           |                  |        | 3660      | 12'     | 29.3           | <b>ER38M38T-3660</b> |

### Coupling sleeve



| Thread    | Outside diameter(D) |        | Length(L) |        | Weight<br>[Kg] | Part number |
|-----------|---------------------|--------|-----------|--------|----------------|-------------|
|           | [mm]                | [in]   | [mm]      | [in]   |                |             |
| T38 - T38 | 54                  | 2 1/8" | 190       | 7 1/2" | 2.0            | <b>CM38</b> |

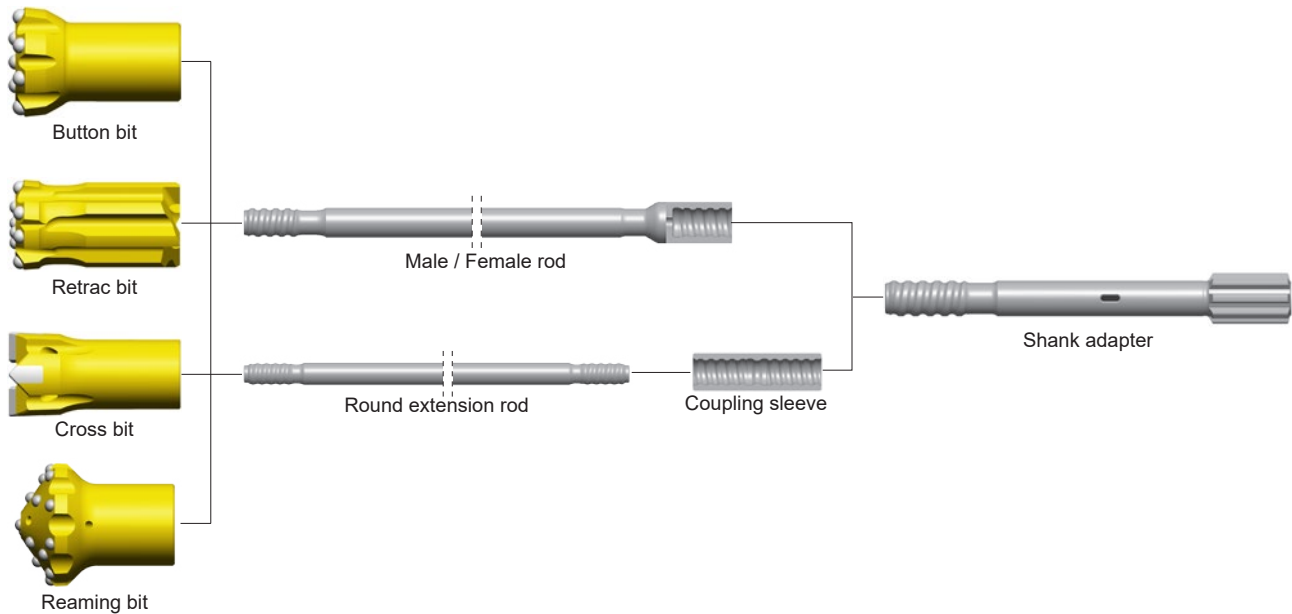
### Crossover coupling



| Thread    | Outside diameter(D) |        | Length(L) |        | Weight<br>[Kg] | Part number    |
|-----------|---------------------|--------|-----------|--------|----------------|----------------|
|           | [mm]                | [in]   | [mm]      | [in]   |                |                |
| T38 - R32 | 54                  | 2 1/8" | 188       | 7 1/2" | 2.2            | <b>CM38R32</b> |
| T38 - T45 | 63                  | 2 1/2" | 215       | 8 1/2" | 3.4            | <b>CM45M38</b> |

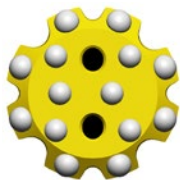
# BENCH & LONG HOLE DRILLING EQUIPMENT

## T45 (1 3/4") SERIES (Recommended gauge diameter Ø70 - Ø115)



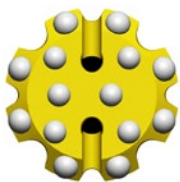
Standard item list - CUSTOM BUTTONS AND FLUSHING CONFIGURATIONS ARE AVAILABLE UPON REQUEST  
For details of bit design, please refer to p.16

### Button bit Type 15



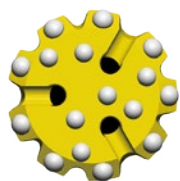
| Gauge diameter |        | Gauge angle [°] | Button × Button dia.[mm] |      | Flushing hole |      | Weight [Kg] | Part number   |
|----------------|--------|-----------------|--------------------------|------|---------------|------|-------------|---------------|
| [mm]           | [in]   |                 | Gauge                    | Face | Side          | Face |             |               |
| 70             | 2 3/4" | 35              | 8×11                     | 4×11 | -             | 2    | 1.9         | 45MPVS70R15M  |
| 70             | 2 3/4" | 40              | 8×11                     | 5×10 | -             | 2    | 1.9         | 45MPVS70R15H  |
| 76             | 3"     | 35              | 8×12                     | 4×11 | -             | 2    | 2.3         | 45MPVS76R15M  |
| 76             | 3"     | 40              | 8×11                     | 5×11 | -             | 2    | 2.3         | 45MPVS76R15H  |
| 89             | 3 1/2" | 35              | 8×13                     | 6×12 | -             | 2    | 3.8         | 45MPVS89R15M  |
| 89             | 3 1/2" | 40              | 8×12                     | 6×12 | -             | 2    | 3.8         | 45MPVS89R15H  |
| 102            | 4"     | 35              | 8×14                     | 6×13 | -             | 2    | 4.4         | 45MPVS102R15M |
| 102            | 4"     | 40              | 8×13                     | 6×13 | -             | 2    | 4.4         | 45MPVS102R15H |

### Button bit Type 25



| Gauge diameter |        | Gauge angle [°] | Button × Button dia.[mm] |      | Flushing hole |      | Weight [Kg] | Part number   |
|----------------|--------|-----------------|--------------------------|------|---------------|------|-------------|---------------|
| [mm]           | [in]   |                 | Gauge                    | Face | Side          | Face |             |               |
| 89             | 3 1/2" | 35              | 8×13                     | 6×12 | -             | 2    | 3.7         | 45MPVS89R25M  |
| 102            | 4"     | 35              | 8×14                     | 6×13 | -             | 2    | 4.3         | 45MPVS102R25M |
| 115            | 4 1/2" | 35              | 8×14                     | 7×13 | -             | 2    | 6.3         | 45MPVS115R25M |

### Button bit Type 23



| Gauge diameter |        | Gauge angle [°] | Button × Button dia.[mm] |      | Flushing hole |      | Weight [Kg] | Part number    |
|----------------|--------|-----------------|--------------------------|------|---------------|------|-------------|----------------|
| [mm]           | [in]   |                 | Gauge                    | Face | Side          | Face |             |                |
| 89             | 3 1/2" | 35              | 9×12                     | 6×12 | -             | 3    | 3.8         | 45MPVS89R23M   |
| 102            | 4"     | 35              | 9×13                     | 6×13 | -             | 3    | 4.4         | 45MPVS102R23M  |
| 115            | 4 1/2" | 35              | 9×13                     | 7×13 | -             | 3    | 6.4         | 45MPVS115R23MS |

## Button bit Type 53 & 55



Type 53 (Ø70-Ø89)



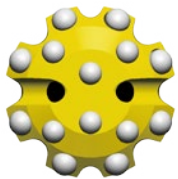
Type 55 (Ø76-Ø115)

| Gauge diameter |        | Gauge angle [°] | Button × Button dia.[mm] |      | Flushing hole |      | Weight [Kg] | Part number   |
|----------------|--------|-----------------|--------------------------|------|---------------|------|-------------|---------------|
| [mm]           | [in]   |                 | Gauge                    | Face | Side          | Face |             |               |
| 70             | 2 3/4" | 35              | 6×11                     | 4×11 | -             | 3    | 1.8         | 45MPVS70R53M  |
| 76             | 3"     | 35              | 6×12                     | 4×11 | -             | 3    | 2.2         | 45MPVS76R53M  |
| 76             | 3"     | 35              | 8×11                     | 5×11 | -             | 4    | 2.3         | 45MPVS76R55M  |
| 89             | 3 1/2" | 35              | 6×13                     | 5×12 | -             | 3    | 3.6         | 45MPVS89R53M  |
| 89             | 3 1/2" | 35              | 8×12                     | 6×12 | -             | 4    | 3.7         | 45MPVS89R55M  |
| 102            | 4"     | 35              | 8×14                     | 6×14 | -             | 4    | 4.3         | 45MPVS102R55M |
| 115            | 4 1/2" | 35              | 8×14                     | 8×14 | -             | 4    | 6.3         | 45MPVS115R55M |

## Button bit Type 83 & 85



Type 83 (Ø70-Ø76)



Type 85 (Ø76-Ø115)

| Gauge diameter |        | * Gauge angle [°] | Button × Button dia.[mm] |            | Flushing hole |      | Weight [Kg] | Part number    |
|----------------|--------|-------------------|--------------------------|------------|---------------|------|-------------|----------------|
| [mm]           | [in]   |                   | Gauge                    | Face       | Side          | Face |             |                |
| 70             | 2 3/4" | 20-40             | 6×11                     | 5×10       | 1             | 1    | 1.8         | 45MPWS70BB83H  |
| 76             | 3"     | 20-40             | 6×11                     | 3×11, 2×10 | 1             | 1    | 2.2         | 45MPWS76BB83H  |
| 76             | 3"     | 20-40             | 8×11                     | 6×10       | 2             | 2    | 2.3         | 45MPWS76BB85H  |
| 89             | 3 1/2" | 20-40             | 8×12                     | 6×12       | 2             | 2    | 3.6         | 45MPWS89BB85H  |
| 102            | 4"     | 20-40             | 8×12                     | 7×12       | -             | 2    | 4.3         | 45MPVS102BB85H |
| 115            | 4 1/2" | 20-40             | 8×14                     | 8×12       | -             | 2    | 6.3         | 45MPVS115BB85H |

\* Face angle 20°, Gauge angle 40°

## Button bit Type 14



| Gauge diameter |        | Gauge angle [°] | Button × Button dia.[mm] |      | Flushing hole |      | Weight [Kg] | Part number   |
|----------------|--------|-----------------|--------------------------|------|---------------|------|-------------|---------------|
| [mm]           | [in]   |                 | Gauge                    | Face | Side          | Face |             |               |
| 70             | 2 3/4" | 35              | 7×11                     | 4×11 | -             | 3    | 1.8         | 45MPVS70R14M  |
| 76             | 3"     | 35              | 7×12                     | 4×11 | -             | 3    | 2.3         | 45MPVS76R14M  |
| 89             | 3 1/2" | 35              | 7×14                     | 5×12 | -             | 3    | 3.6         | 45MPVS89R14M  |
| 102            | 4"     | 35              | 7×14                     | 5×13 | -             | 3    | 4.3         | 45MPVS102R14M |

## Cross bit



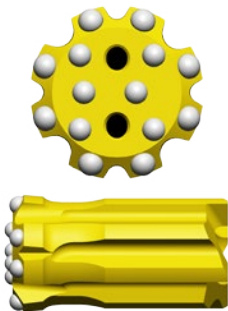
| Gauge diameter |        | Carbide size W × H [mm] | Button × Button dia.[mm] |      | Flushing hole |      | Weight [Kg] | Part number |
|----------------|--------|-------------------------|--------------------------|------|---------------|------|-------------|-------------|
| [mm]           | [in]   |                         | Gauge                    | Face | Side          | Face |             |             |
| 76             | 3"     | 13×22                   | -                        | -    | 4             | 1    | 2.5         | 45MX76S2    |
| 89             | 3 1/2" | 13×22                   | -                        | -    | 4             | 1    | 4.0         | 45MX89S     |



# BENCH & LONG HOLE DRILLING EQUIPMENT

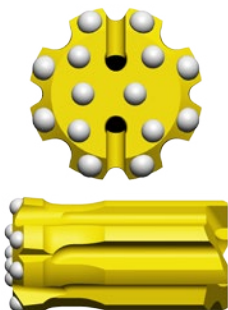
## T45 (1 3/4") SERIES (Recommended gauge diameter Ø76 - Ø115)

### Retrac Button bit Type 15



| Gauge diameter |        | Gauge angle [°] | Button × Button dia.[mm] |      | Flushing hole |      | Weight [Kg] | Part number   |
|----------------|--------|-----------------|--------------------------|------|---------------|------|-------------|---------------|
| [mm]           | [in]   |                 | Gauge                    | Face | Side          | Face |             |               |
| 76             | 3"     | 35              | 8×12                     | 4×11 | -             | 2    | 3.0         | 45MPVR76R15M  |
| 89             | 3 1/2" | 35              | 8×13                     | 6×12 | -             | 2    | 4.5         | 45MPVR89R15M  |
| 102            | 4"     | 35              | 8×14                     | 6×13 | -             | 2    | 6.6         | 45MPVR102R15M |

### Retrac Button bit Type 25



| Gauge diameter |        | Gauge angle [°] | Button × Button dia.[mm] |      | Flushing hole |      | Weight [Kg] | Part number   |
|----------------|--------|-----------------|--------------------------|------|---------------|------|-------------|---------------|
| [mm]           | [in]   |                 | Gauge                    | Face | Side          | Face |             |               |
| 89             | 3 1/2" | 35              | 8×13                     | 6×12 | -             | 2    | 4.4         | 45MPVR89R25M  |
| 102            | 4"     | 35              | 8×14                     | 6×13 | -             | 2    | 6.5         | 45MPVR102R25M |
| 115            | 4 1/2" | 35              | 8×14                     | 7×13 | -             | 2    | 8.4         | 45MPVR115R25M |

### Retrac Button bit Type 53 & 55



Type 53 (Ø76-Ø89)

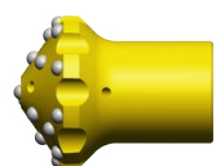


Type 55 (Ø76-Ø102)



| Gauge diameter |        | Gauge angle [°] | Button × Button dia.[mm] |      | Flushing hole |      | Weight [Kg] | Part number   |
|----------------|--------|-----------------|--------------------------|------|---------------|------|-------------|---------------|
| [mm]           | [in]   |                 | Gauge                    | Face | Side          | Face |             |               |
| 76             | 3"     | 35              | 6×12                     | 4×11 | -             | 3    | 2.9         | 45MPVR76R53M  |
| 76             | 3"     | 35              | 8×11                     | 5×11 | -             | 4    | 3.0         | 45MPVR76R55M  |
| 89             | 3 1/2" | 35              | 6×13                     | 5×12 | -             | 3    | 4.2         | 45MPVR89R53M  |
| 89             | 3 1/2" | 35              | 8×12                     | 6×12 | -             | 4    | 4.5         | 45MPVR89R55M  |
| 102            | 4"     | 35              | 8×14                     | 6×14 | -             | 4    | 6.5         | 45MPVR102R55M |
| 115            | 4 1/2" | 35              | 8×14                     | 8×14 | -             | 4    | 8.4         | 45MPVR115R55M |

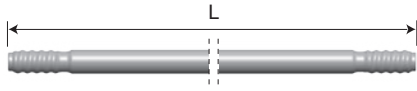
### Reaming bit integration model



| Gauge diameter |      | Gauge angle [°] | Button × Button dia.[mm] |       | Flushing hole |      | Weight [Kg] | Part number   |
|----------------|------|-----------------|--------------------------|-------|---------------|------|-------------|---------------|
| [mm]           | [in] |                 | Gauge                    | Face  | Side          | Face |             |               |
| 127            | 5"   | 35              | 9×13                     | 10×13 | 3             | 1    | 7.5         | WI45MPJ127R-D |
| 152            | 6"   | 35              | 9×14                     | 11×14 | 3             | 1    | 10.5        | WI45MPJ152R-D |

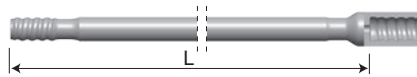


## Round extension rod



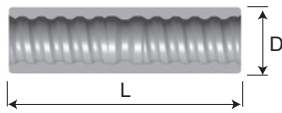
| Thread    | Outside diameter |        | Length(L) |         | Weight<br>[Kg] | Part number         |
|-----------|------------------|--------|-----------|---------|----------------|---------------------|
|           | [mm]             | [in]   | [mm]      | [ft/in] |                |                     |
| T45 - T45 | 45               | 1 3/4" | 3050      | 10'     | 34.1           | <b>ER45M45-3050</b> |
|           |                  |        | 3660      | 12'     | 41.0           | <b>ER45M45-3660</b> |
|           |                  |        | 4270      | 14'     | 48.1           | <b>ER45M45-4270</b> |
|           |                  |        | 4880      | 16'     | 54.9           | <b>ER45M45-4880</b> |
|           |                  |        | 6100      | 20'     | 68.9           | <b>ER45M45-6100</b> |

## Male / Female rod



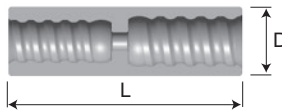
| Thread    | Outside diameter |        | Length(L) |         | Weight<br>[Kg] | Part number           |
|-----------|------------------|--------|-----------|---------|----------------|-----------------------|
|           | [mm]             | [in]   | [mm]      | [ft/in] |                |                       |
| T45 - T45 | 45               | 1 3/4" | 1525      | 5'      | 18.4           | <b>ER45M45MF-1525</b> |
|           |                  |        | 1830      | 6'      | 22.1           | <b>ER45M45MF-1830</b> |
|           |                  |        | 3050      | 10'     | 36.1           | <b>ER45M45MF-3050</b> |
|           |                  |        | 3660      | 12'     | 43.3           | <b>ER45M45MF-3660</b> |
|           |                  |        | 4270      | 14'     | 50.2           | <b>ER45M45MF-4270</b> |

## Coupling sleeve



| Thread    | Outside diameter(D) |        | Length(L) |        | Weight<br>[Kg] | Part number   |
|-----------|---------------------|--------|-----------|--------|----------------|---------------|
|           | [mm]                | [in]   | [mm]      | [in]   |                |               |
| T45 - T45 | 63                  | 2 1/2" | 210       | 8 1/4" | 3.0            | <b>CM45</b>   |
| T45 - T45 | 66                  | 2 5/8" | 210       | 8 1/4" | 3.5            | <b>CM45-2</b> |

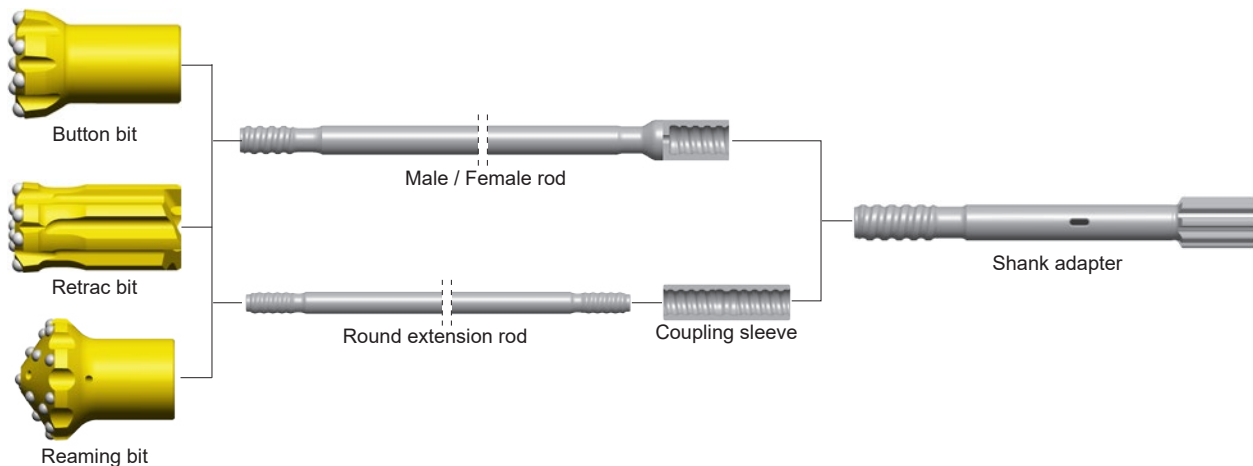
## Crossover coupling



| Thread    | Outside diameter(D) |        | Length(L) |        | Weight<br>[Kg] | Part number    |
|-----------|---------------------|--------|-----------|--------|----------------|----------------|
|           | [mm]                | [in]   | [mm]      | [in]   |                |                |
| T45 - T38 | 63                  | 2 1/2" | 215       | 8 1/2" | 3.4            | <b>CM45M38</b> |
| T45 - T51 | 72                  | 2 7/8" | 240       | 9 1/2" | 5.0            | <b>CM51M45</b> |

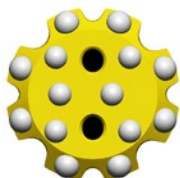
# BENCH & LONG HOLE DRILLING EQUIPMENT

## T51 (2") SERIES (Recommended gauge diameter Ø89 - Ø127)



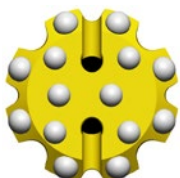
Standard item list - CUSTOM BUTTONS AND FLUSHING CONFIGURATIONS ARE AVAILABLE UPON REQUEST  
For details of bit design, please refer to p.16

### Button bit Type 15



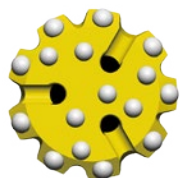
| Gauge diameter |        | Gauge angle [°] | Button × Button dia.[mm] |      | Flushing hole |      | Weight [Kg] | Part number   |
|----------------|--------|-----------------|--------------------------|------|---------------|------|-------------|---------------|
| [mm]           | [in]   |                 | Gauge                    | Face | Side          | Face |             |               |
| 89             | 3 1/2" | 35              | 8×13                     | 6×12 | -             | 2    | 4.1         | 51MPVS89R15M  |
| 89             | 3 1/2" | 40              | 8×12                     | 6×12 | -             | 2    | 4.1         | 51MPVS89R15H  |
| 102            | 4"     | 35              | 8×14                     | 6×13 | -             | 2    | 5.2         | 51MPVS102R15M |
| 102            | 4"     | 40              | 8×13                     | 6×13 | -             | 2    | 5.2         | 51MPVS102R15H |

### Button bit Type 25



| Gauge diameter |        | Gauge angle [°] | Button × Button dia.[mm] |      | Flushing hole |      | Weight [Kg] | Part number   |
|----------------|--------|-----------------|--------------------------|------|---------------|------|-------------|---------------|
| [mm]           | [in]   |                 | Gauge                    | Face | Side          | Face |             |               |
| 89             | 3 1/2" | 35              | 8×13                     | 6×12 | -             | 2    | 4.0         | 51MPVS89R25M  |
| 102            | 4"     | 35              | 8×14                     | 6×13 | -             | 2    | 5.1         | 51MPVS102R25M |
| 115            | 4 1/2" | 35              | 8×14                     | 7×13 | -             | 2    | 6.6         | 51MPVS115R25M |
| 127            | 5"     | 35              | 8×16                     | 8×14 | -             | 2    | 8.7         | 51MPVS127R25M |

### Button bit Type 23



| Gauge diameter |        | Gauge angle [°] | Button × Button dia.[mm] |      | Flushing hole |      | Weight [Kg] | Part number    |
|----------------|--------|-----------------|--------------------------|------|---------------|------|-------------|----------------|
| [mm]           | [in]   |                 | Gauge                    | Face | Side          | Face |             |                |
| 89             | 3 1/2" | 35              | 9×12                     | 6×12 | -             | 3    | 4.1         | 51MPVS89R23M   |
| 102            | 4"     | 35              | 9×13                     | 6×13 | -             | 3    | 5.2         | 51MPVS102R23M  |
| 115            | 4 1/2" | 35              | 9×13                     | 7×13 | -             | 3    | 6.7         | 51MPVS115R23MS |
| 115            | 4 1/2" | 35              | 9×14                     | 7×14 | -             | 3    | 6.8         | 51MPVS115R23M  |
| 127            | 5"     | 35              | 9×14                     | 7×14 | -             | 3    | 8.8         | 51MPVS127R23MS |
| 127            | 5"     | 35              | 9×16                     | 7×16 | -             | 3    | 8.9         | 51MPVS127R23M  |

## Button bit Type 53 & 55



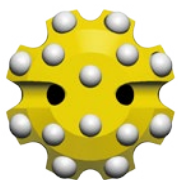
Type 53 (Ø89)



Type 55 (Ø89-Ø127)

| Gauge diameter |        | Gauge angle [°] | Button × Button dia.[mm] |            | Flushing hole |      | Weight [Kg] | Part number   |
|----------------|--------|-----------------|--------------------------|------------|---------------|------|-------------|---------------|
| [mm]           | [in]   |                 | Gauge                    | Face       | Side          | Face |             |               |
| 89             | 3 1/2" | 35              | 6×13                     | 5×12       | -             | 3    | 3.9         | 51MPVS89R53M  |
| 89             | 3 1/2" | 35              | 8×12                     | 6×12       | -             | 4    | 4.0         | 51MPVS89R55M  |
| 102            | 4"     | 35              | 8×14                     | 6×14       | -             | 4    | 5.1         | 51MPVS102R55M |
| 115            | 4 1/2" | 35              | 8×14                     | 8×14       | -             | 4    | 6.6         | 51MPVS115R55M |
| 127            | 5"     | 35              | 8×16                     | 4×16, 4×14 | -             | 4    | 8.7         | 51MPVS127R55M |

## Button bit Type 85



| Gauge diameter |        | * Gauge angle [°] | Button × Button dia.[mm] |            | Flushing hole |      | Weight [Kg] | Part number    |
|----------------|--------|-------------------|--------------------------|------------|---------------|------|-------------|----------------|
| [mm]           | [in]   |                   | Gauge                    | Face       | Side          | Face |             |                |
| 89             | 3 1/2" | 20-40             | 8×12                     | 6×12       | 2             | 2    | 3.9         | 51MPWS89BB85H  |
| 102            | 4"     | 20-40             | 8×12                     | 7×12       | -             | 2    | 5.0         | 51MPVS102BB85H |
| 115            | 4 1/2" | 20-40             | 8×14                     | 8×12       | -             | 2    | 6.5         | 51MPVS115BB85H |
| 127            | 5"     | 20-40             | 8×14                     | 4×14, 4×12 | -             | 2    | 8.6         | 51MPVS127BB85H |

\* Face angle 20°, Gauge angle 40°

## Button bit Type 14

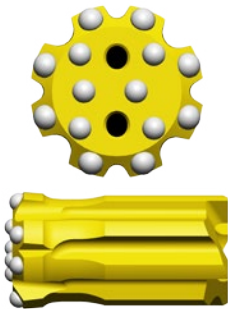


| Gauge diameter |        | Gauge angle [°] | Button × Button dia.[mm] |      | Flushing hole |      | Weight [Kg] | Part number   |
|----------------|--------|-----------------|--------------------------|------|---------------|------|-------------|---------------|
| [mm]           | [in]   |                 | Gauge                    | Face | Side          | Face |             |               |
| 89             | 3 1/2" | 35              | 7×14                     | 5×12 | -             | 3    | 4.0         | 51MPVS89R14M  |
| 102            | 4"     | 35              | 7×14                     | 5×13 | -             | 3    | 5.1         | 51MPVS102R14M |

# BENCH & LONG HOLE DRILLING EQUIPMENT

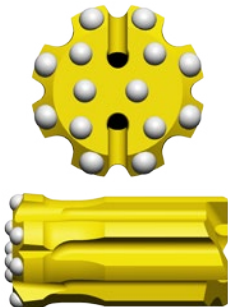
## T51 (2") SERIES (Recommended gauge diameter Ø89 - Ø127)

### Retrac Button bit Type 15



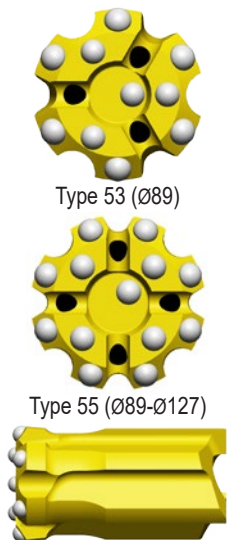
| Gauge diameter |        | Gauge angle [°] | Button × Button dia.[mm] |      | Flushing hole |      | Weight [Kg] | Part number   |
|----------------|--------|-----------------|--------------------------|------|---------------|------|-------------|---------------|
| [mm]           | [in]   |                 | Gauge                    | Face | Side          | Face |             |               |
| 89             | 3 1/2" | 35              | 8×13                     | 6×12 | -             | 2    | 4.4         | 51MPVR89R15M  |
| 102            | 4"     | 35              | 8×14                     | 6×13 | -             | 2    | 6.5         | 51MPVR102R15M |

### Retrac Button bit Type 25



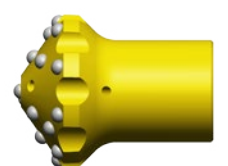
| Gauge diameter |        | Gauge angle [°] | Button × Button dia.[mm] |      | Flushing hole |      | Weight [Kg] | Part number   |
|----------------|--------|-----------------|--------------------------|------|---------------|------|-------------|---------------|
| [mm]           | [in]   |                 | Gauge                    | Face | Side          | Face |             |               |
| 89             | 3 1/2" | 35              | 8×13                     | 6×12 | -             | 2    | 4.3         | 51MPVR89R25M  |
| 102            | 4"     | 35              | 8×14                     | 6×13 | -             | 2    | 6.4         | 51MPVR102R25M |
| 115            | 4 1/2" | 35              | 8×14                     | 7×13 | -             | 2    | 8.3         | 51MPVR115R25M |
| 127            | 5"     | 35              | 8×16                     | 8×14 | -             | 2    | 10.7        | 51MPVR127R25M |

### Retrac Button bit Type 53 & 55



| Gauge diameter |        | Gauge angle [°] | Button × Button dia.[mm] |            | Flushing hole |      | Weight [Kg] | Part number   |
|----------------|--------|-----------------|--------------------------|------------|---------------|------|-------------|---------------|
| [mm]           | [in]   |                 | Gauge                    | Face       | Side          | Face |             |               |
| 89             | 3 1/2" | 35              | 6×13                     | 5×12       | -             | 3    | 4.2         | 51MPVR89R53M  |
| 89             | 3 1/2" | 35              | 8×12                     | 6×12       | -             | 4    | 4.3         | 51MPVR89R55M  |
| 102            | 4"     | 35              | 8×14                     | 6×14       | -             | 4    | 6.4         | 51MPVR102R55M |
| 115            | 4 1/2" | 35              | 8×14                     | 8×14       | -             | 4    | 8.3         | 51MPVR115R55M |
| 127            | 5"     | 35              | 8×16                     | 4×16, 4×14 | -             | 4    | 10.7        | 51MPVR127R55M |

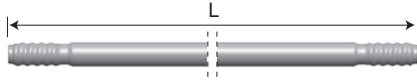
### Reaming bit integration model



| Gauge diameter |      | Gauge angle [°] | Button × Button dia.[mm] |       | Flushing hole |      | Weight [Kg] | Part number   |
|----------------|------|-----------------|--------------------------|-------|---------------|------|-------------|---------------|
| [mm]           | [in] |                 | Gauge                    | Face  | Side          | Face |             |               |
| 152            | 6"   | 35              | 9×14                     | 11×14 | 3             | 1    | 10.6        | WI51MPJ152R-D |

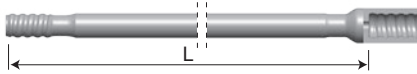


## Round extension rod



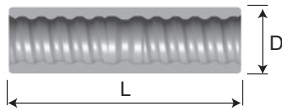
| Thread    | Outside diameter |      | Length(L) |         | Weight<br>[Kg] | Part number         |
|-----------|------------------|------|-----------|---------|----------------|---------------------|
|           | [mm]             | [in] | [mm]      | [ft/in] |                |                     |
| T51 - T51 | 51               | 2"   | 3660      | 12'     | 49.6           | <b>ER51M51-3660</b> |
|           |                  |      | 4270      | 14'     | 58.1           | <b>ER51M51-4270</b> |
|           |                  |      | 6100      | 20'     | 82.9           | <b>ER51M51-6100</b> |

## Male / Female rod



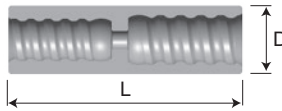
| Thread    | Outside diameter |      | Length(L) |         | Weight<br>[Kg] | Part number           |
|-----------|------------------|------|-----------|---------|----------------|-----------------------|
|           | [mm]             | [in] | [mm]      | [ft/in] |                |                       |
| T51 - T51 | 51               | 2"   | 1525      | 5'      | 22.0           | <b>ER51M51MF-1525</b> |
|           |                  |      | 1830      | 6'      | 26.4           | <b>ER51M51MF-1830</b> |
|           |                  |      | 3660      | 12'     | 52.8           | <b>ER51M51MF-3660</b> |
|           |                  |      | 4270      | 14'     | 61.6           | <b>ER51M51MF-4270</b> |

## Coupling sleeve



| Thread    | Outside diameter(D) |        | Length(L) |        | Weight<br>[Kg] | Part number   |
|-----------|---------------------|--------|-----------|--------|----------------|---------------|
|           | [mm]                | [in]   | [mm]      | [in]   |                |               |
| T51 - T51 | 72                  | 2 7/8" | 235       | 9 1/4" | 4.4            | <b>CM51</b>   |
| T51 - T51 | 77                  | 3"     | 235       | 9 1/4" | 5.5            | <b>CM51-2</b> |

## Crossover coupling



| Thread    | Outside diameter(D) |        | Length(L) |        | Weight<br>[Kg] | Part number    |
|-----------|---------------------|--------|-----------|--------|----------------|----------------|
|           | [mm]                | [in]   | [mm]      | [in]   |                |                |
| T51 - T45 | 72                  | 2 7/8" | 240       | 9 1/2" | 5.0            | <b>CM51M45</b> |

# BENCH & LONG HOLE DRILLING EQUIPMENT

## GM60 SERIES (Recommended gauge diameter Ø96 - Ø153)



### GM60 SERIES

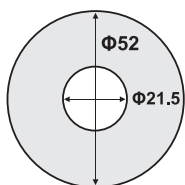
#### Compared with T51 rods, GM60 rods have

- 38% larger rod cross-section, providing higher penetration rate.
- 10% bigger flushing area, providing more efficient flushing.
- 55% higher bending stiffness, providing straighter holes.

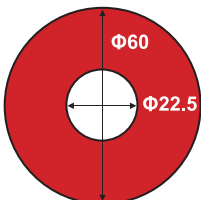
|                   | T51  | GM60 |
|-------------------|------|------|
| Rod Cross Section | 100% | 138% |
| Flushing Area     | 100% | 110% |
| Bending Stiffness | 100% | 155% |

- The GM60 system provides double the penetration rate at half the energy consumed compared with DTH drilling.
- Our top-quality Carbide buttons, formulated and sintered in house.
- Compared with other drilling tool systems, the GM60 system permits a wider hole range using the same rock drill.

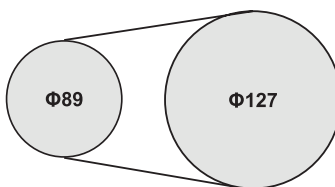
T51 Cross Section



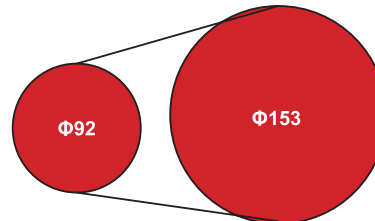
GM60 Cross Section



T51 Hole Range



GM60 Hole Range



### Button bit

#### NORMAL SKIRT

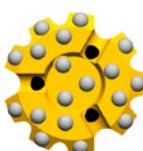
| Gauge diameter |        | Gauge angle[°] | Button x Button dia.[mm] |           | Flushing hole [mm] | Face design | Weight [Kg] | Part number     |
|----------------|--------|----------------|--------------------------|-----------|--------------------|-------------|-------------|-----------------|
| [mm]           | [in]   |                | Gauge                    | Face      |                    |             |             |                 |
| 92             | 3 5/8" | 35             | 8X12                     | 6X12      | 4X11               | 55          | 5.6         | 60GMPVS92BB55M  |
| 102            | 4"     | 35             | 8X14                     | 6X14      | 4X11               | 55          | 6.9         | 60GMPVS102R55M  |
| 102            | 4"     | 35             | 8X14                     | 6X14      | 4X11               | 55          | 6.9         | 60GMPVS102BB55M |
| 115            | 4 1/2" | 35             | 8X14                     | 8X14      | 4X11               | 55          | 8.4         | 60GMPVS115R55M  |
| 127            | 5"     | 35             | 8X16                     | 4X14 4X16 | 4X12               | 55          | 9.5         | 60GMPVS127R55M  |
| 140            | 5 1/2" | 35             | 8X16                     | 8X16      | 4X12               | 55          | 11.9        | 60GMPVS140R55M  |
| 140            | 5 1/2" | 35             | 9X16                     | 9X16      | 3X14               | 53          | 11.9        | 60GMPVS140R53M  |
| 153            | 6"     | 35             | 10X16                    | 3X14 6X16 | 4X13               | 5X          | 15.4        | 60GMPVS153BB5XM |

#### RETRAC SKIRT

|     |        |    |       |           |      |    |      |                 |
|-----|--------|----|-------|-----------|------|----|------|-----------------|
| 92  | 3 5/8" | 35 | 8X12  | 6X12      | 4X11 | 55 | 6.2  | 60GMPVR92BB55M  |
| 102 | 4"     | 35 | 8X14  | 6X14      | 4X11 | 55 | 7.6  | 60GMPVR102R55M  |
| 112 | 4 3/8" | 35 | 8X14  | 8X14      | 4X11 | 55 | 9.1  | 60GMPVR112R55M  |
| 115 | 4 1/2" | 35 | 8X14  | 6X14      | 4X11 | 55 | 9.6  | 60GMPVR115R55M  |
| 115 | 4 1/2" | 35 | 8X14  | 6X14      | 4X11 | 55 | 9.6  | 60GMPVR115BB55M |
| 115 | 4 1/2" | 35 | 9X16  | 7X14      | 3X15 | 23 | 10.1 | 60GMPVR115R23MB |
| 121 | 4 3/4" | 35 | 8X16  | 8X14      | 4X12 | 55 | 12.1 | 60GMPVR121BB55M |
| 127 | 5"     | 35 | 8X16  | 4X14 4X16 | 4X12 | 55 | 13.1 | 60GMPVR127R55M  |
| 127 | 5"     | 35 | 8X16  | 4X14 4X16 | 4X12 | 55 | 13.1 | 60GMPVR127BB55M |
| 127 | 5"     | 35 | 9X16  | 9X14      | 3X15 | 23 | 13.8 | 60GMPVR127R23M1 |
| 140 | 5 1/2" | 35 | 9X16  | 9X16      | 3X14 | 53 | 15.2 | 60GMPVR140R53M  |
| 153 | 6"     | 35 | 10X16 | 3X14 6X16 | 4X13 | 5X | 18.8 | 60GMPVR153R5XM  |



Type 23



Type 53



Type 55

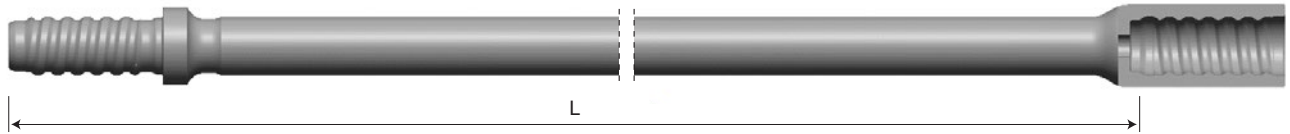


Type 5X

### Male / Female rod

| Thread      | Outside diameter |        | Length(L) |         | Weight [Kg] | Part number            |
|-------------|------------------|--------|-----------|---------|-------------|------------------------|
|             | [mm]             | [in]   | [mm]      | [ft/in] |             |                        |
| GM60 – GM60 | 60               | 2 1/4" | 3660      | 12'     | 74.4        | <b>ER60GM60MF-3660</b> |
|             | 60               | 2 1/4" | 4270      | 14'     | 86.0        | <b>ER60GM60MF-4270</b> |
|             | 60               | 2 1/4" | 5490      | 18'     | 109.3       | <b>ER60GM60MF-5490</b> |
|             | 60               | 2 1/4" | 6100      | 20'     | 121.0       | <b>ER60GM60MF-6100</b> |

Female end ø85mm, Flushing hole ø22.5mm.

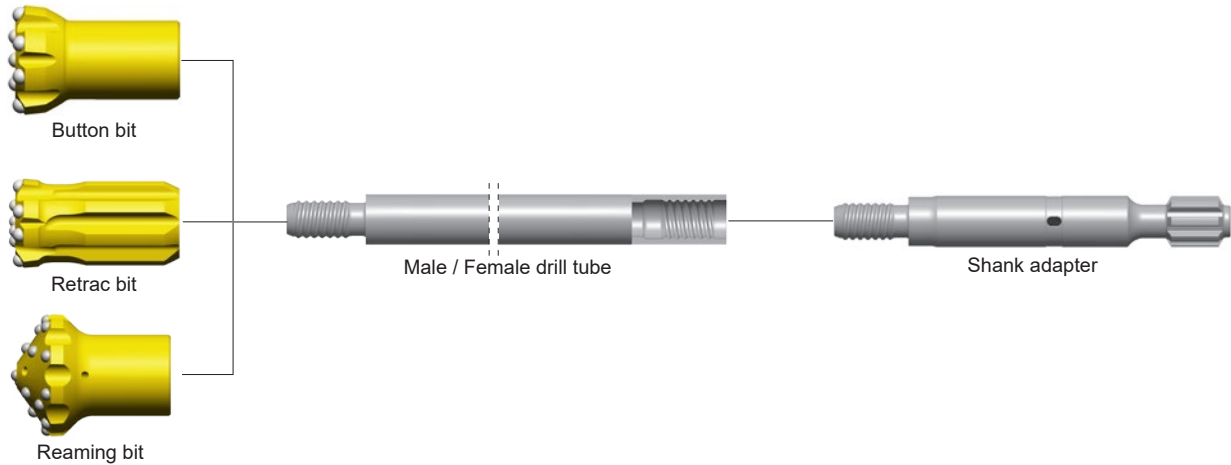


### Shank adapter

| Manufacturer    | Drifter        | Thread | Length(L) [mm] | Flushing tube dia [mm] | Weight [Kg] | Part number         |
|-----------------|----------------|--------|----------------|------------------------|-------------|---------------------|
| Sandvik/Tamrock | HL1000/ HL1500 | GM60   | 670            | SF                     | 13.2        | <b>S357GM60SFBG</b> |
| Sandvik/Tamrock | HL1500         | GM60   | 760            | SF                     | 21.3        | <b>S283GM60SFCG</b> |
| Atlas copco     | COP2560        | GM60   | 770            | SF                     | 14.3        | <b>S312GM60SFA</b>  |
| Atlas copco     | COP3060MEX     | GM60   | 840            | SF                     | 17.3        | <b>S399GM60SFB</b>  |

# TUBE DRILLING EQUIPMENT

## ST58 (2 1/4") SERIES (Recommended gauge diameter Ø89 - Ø127)



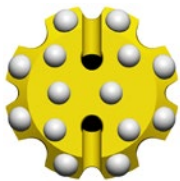
Standard item list - CUSTOM BUTTONS AND FLUSHING CONFIGURATIONS ARE AVAILABLE UPON REQUEST  
For details of bit design, please refer to p.16

### Button bit Type 15



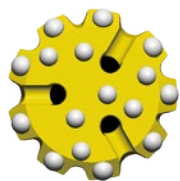
| Gauge diameter |        | Gauge angle [°] | Button × Button dia.[mm] |      | Flushing hole |      | Weight [Kg] | Part number    |
|----------------|--------|-----------------|--------------------------|------|---------------|------|-------------|----------------|
| [mm]           | [in]   |                 | Gauge                    | Face | Side          | Face |             |                |
| 89             | 3 1/2" | 35              | 8×13                     | 6×12 | -             | 2    | 4.0         | 58WDPVS89R15M  |
| 89             | 3 1/2" | 40              | 8×12                     | 6×12 | -             | 2    | 4.0         | 58WDPVS89R15H  |
| 102            | 4"     | 35              | 8×14                     | 6×13 | -             | 2    | 5.0         | 58WDPVS102R15M |
| 102            | 4"     | 40              | 8×13                     | 6×13 | -             | 2    | 4.9         | 58WDPVS102R15H |

### Button bit Type 25



| Gauge diameter |        | Gauge angle [°] | Button × Button dia.[mm] |      | Flushing hole |      | Weight [Kg] | Part number    |
|----------------|--------|-----------------|--------------------------|------|---------------|------|-------------|----------------|
| [mm]           | [in]   |                 | Gauge                    | Face | Side          | Face |             |                |
| 89             | 3 1/2" | 35              | 8×13                     | 6×12 | -             | 2    | 3.9         | 58WDPVS89R25M  |
| 102            | 4"     | 35              | 8×14                     | 6×13 | -             | 2    | 4.9         | 58WDPVS102R25M |
| 115            | 4 1/2" | 35              | 8×14                     | 7×13 | -             | 2    | 6.9         | 58WDPVS115R25M |
| 127            | 5"     | 35              | 8×16                     | 8×14 | -             | 2    | 8.9         | 58WDPVS127R25M |

### Button bit Type 23



| Gauge diameter |        | Gauge angle [°] | Button × Button dia.[mm] |      | Flushing hole |      | Weight [Kg] | Part number     |
|----------------|--------|-----------------|--------------------------|------|---------------|------|-------------|-----------------|
| [mm]           | [in]   |                 | Gauge                    | Face | Side          | Face |             |                 |
| 89             | 3 1/2" | 35              | 9×12                     | 6×12 | -             | 3    | 3.9         | 58WDPVS89R23M   |
| 102            | 4"     | 35              | 9×13                     | 6×13 | -             | 3    | 5.0         | 58WDPVS102R23M  |
| 115            | 4 1/2" | 35              | 9×13                     | 7×13 | -             | 3    | 6.9         | 58WDPVS115R23MS |
| 115            | 4 1/2" | 35              | 9×14                     | 7×14 | -             | 3    | 7.0         | 58WDPVS115R23M  |
| 127            | 5"     | 35              | 9×14                     | 7×14 | -             | 3    | 8.9         | 58WDPVS127R23MS |
| 127            | 5"     | 35              | 9×16                     | 7×16 | -             | 3    | 9.0         | 58WDPVS127R23M  |

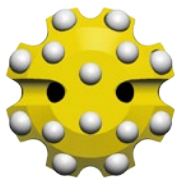
### Button bit Type 55



| Gauge diameter |        | Gauge angle [°] | Button × Button dia.[mm] |            | Flushing hole |      | Weight [Kg] | Part number    |
|----------------|--------|-----------------|--------------------------|------------|---------------|------|-------------|----------------|
| [mm]           | [in]   |                 | Gauge                    | Face       | Side          | Face |             |                |
| 89             | 3 1/2" | 35              | 8×12                     | 6×12       | -             | 4    | 3.8         | 58WDPVS89R55M  |
| 102            | 4"     | 35              | 8×14                     | 6×14       | -             | 4    | 4.9         | 58WDPVS102R55M |
| 115            | 4 1/2" | 35              | 8×14                     | 8×14       | -             | 4    | 6.9         | 58WDPVS115R55M |
| 127            | 5"     | 35              | 8×16                     | 4×16, 4×14 | -             | 4    | 8.9         | 58WDPVS127R55M |



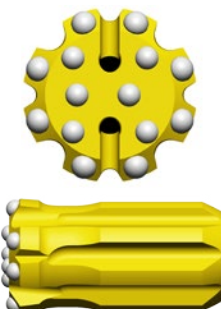
## Button bit Type 85



| Gauge diameter |        | * Gauge angle [°] | Button × Button dia.[mm] |            | Flushing hole |      | Weight [Kg] | Part number     |
|----------------|--------|-------------------|--------------------------|------------|---------------|------|-------------|-----------------|
| [mm]           | [in]   |                   | Gauge                    | Face       | Side          | Face |             |                 |
| 89             | 3 1/2" | 20-40             | 8×12                     | 6×12       | 2             | 2    | 3.7         | 58WDPWS89BB85H  |
| 102            | 4"     | 20-40             | 8×13                     | 7×12       | -             | 2    | 4.8         | 58WDPVS102BB85H |
| 115            | 4 1/2" | 20-40             | 8×14                     | 8×12       | -             | 2    | 6.8         | 58WDPVS115BB85H |
| 127            | 5"     | 20-40             | 8×14                     | 4×14, 4×12 | -             | 2    | 8.8         | 58WDPVS127BB85H |

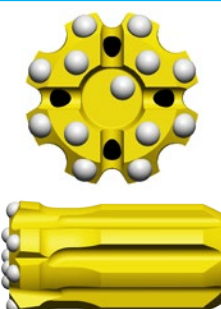
\* Face angle 20°, Gauge angle 40°

## Retrac Button bit Type 25



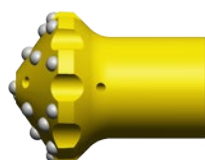
| Gauge diameter |        | Gauge angle [°] | Button × Button dia.[mm] |      | Flushing hole |      | Weight [Kg] | Part number    |
|----------------|--------|-----------------|--------------------------|------|---------------|------|-------------|----------------|
| [mm]           | [in]   |                 | Gauge                    | Face | Side          | Face |             |                |
| 89             | 3 1/2" | 35              | 8×13                     | 6×12 | -             | 2    | 5.6         | 58WDPVR89R25M  |
| 102            | 4"     | 35              | 8×14                     | 6×13 | -             | 2    | 7.8         | 58WDPVR102R25M |
| 115            | 4 1/2" | 35              | 8×14                     | 7×13 | -             | 2    | 10.6        | 58WDPVR115R25M |
| 127            | 5"     | 35              | 8×16                     | 8×14 | -             | 2    | 12.8        | 58WDPVR127R25M |

## Retrac Button bit Type 55



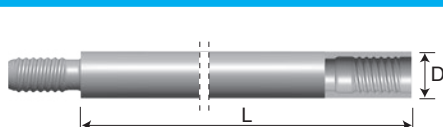
| Gauge diameter |        | Gauge angle [°] | Button × Button dia.[mm] |            | Flushing hole |      | Weight [Kg] | Part number    |
|----------------|--------|-----------------|--------------------------|------------|---------------|------|-------------|----------------|
| [mm]           | [in]   |                 | Gauge                    | Face       | Side          | Face |             |                |
| 89             | 3 1/2" | 35              | 8×12                     | 6×12       | -             | 4    | 5.4         | 58WDPVR89R55M  |
| 102            | 4"     | 35              | 8×14                     | 6×14       | -             | 4    | 7.6         | 58WDPVR102R55M |
| 115            | 4 1/2" | 35              | 8×14                     | 8×14       | -             | 4    | 10.4        | 58WDPVR115R55M |
| 127            | 5"     | 35              | 8×16                     | 4×16, 4×14 | -             | 4    | 12.6        | 58WDPVR127R55M |

## Reaming bit integration model



| Gauge diameter |      | Gauge angle [°] | Button × Button dia.[mm] |       | Flushing hole |      | Weight [Kg] | Part number   |
|----------------|------|-----------------|--------------------------|-------|---------------|------|-------------|---------------|
| [mm]           | [in] |                 | Gauge                    | Face  | Side          | Face |             |               |
| 152            | 6"   | 35              | 9×14                     | 11×14 | 3             | 1    | 11.0        | WI58WDP152R-D |

## Male / Female drill tube



| Thread      | Outside diameter(D) |      | Length(L) |         | Weight [Kg] | Part number     |
|-------------|---------------------|------|-----------|---------|-------------|-----------------|
|             | [mm]                | [in] | [mm]      | [ft/in] |             |                 |
| ST58 - ST58 | 77                  | 3"   | 1525      | 5'      | 34.0        | GR77WD58MF-1525 |
|             |                     |      | 1830      | 6'      | 40.3        | GR77WD58MF-1830 |

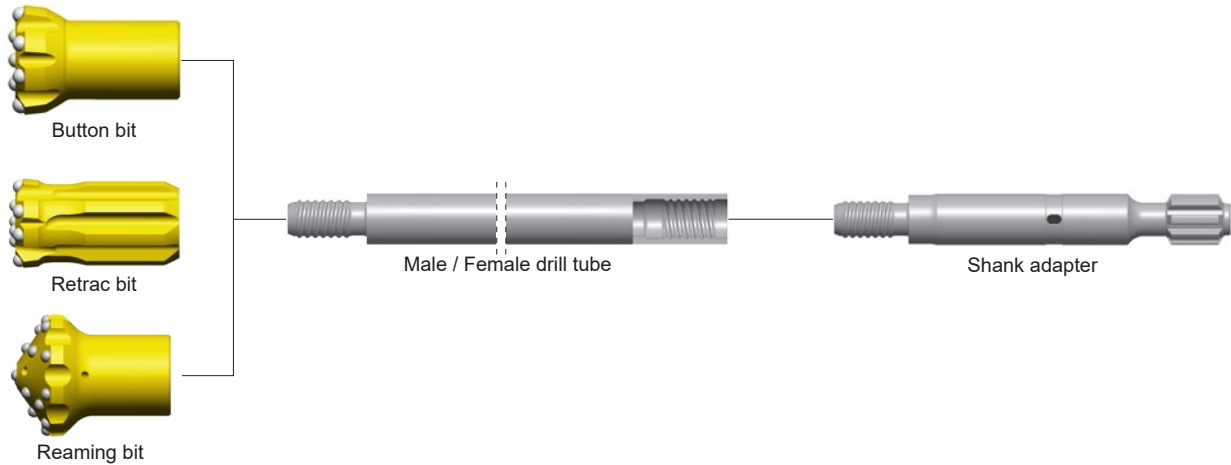
## Recovery pike



| Outside diameter(D) |      | Length(L) |         | Weight [Kg] | Part number   |
|---------------------|------|-----------|---------|-------------|---------------|
| [mm]                | [in] | [mm]      | [in]    |             |               |
| 78                  | 3"   | 260       | 10 1/4" | 3.4         | FTM-58WD-GR78 |

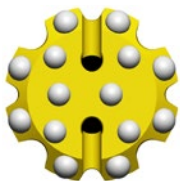
# TUBE DRILLING EQUIPMENT

## ST68 (2 3/4") SERIES (Recommended gauge diameter Ø102 - Ø127)



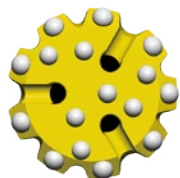
Standard item list - CUSTOM BUTTONS AND FLUSHING CONFIGURATIONS ARE AVAILABLE UPON REQUEST  
For details of bit design, please refer to p.16

### Button bit Type 25



| Gauge diameter |        | Gauge angle [°] | Button × Button dia.[mm] |      | Flushing hole |      | Weight [Kg] | Part number    |
|----------------|--------|-----------------|--------------------------|------|---------------|------|-------------|----------------|
| [mm]           | [in]   |                 | Gauge                    | Face | Side          | Face |             |                |
| 102            | 4"     | 35              | 8×14                     | 6×13 | -             | 2    | 5.8         | 68WDPVS102R25M |
| 115            | 4 1/2" | 35              | 8×14                     | 7×13 | -             | 2    | 7.8         | 68WDPVS115R25M |
| 127            | 5"     | 35              | 8×16                     | 8×14 | -             | 2    | 10.2        | 68WDPVS127R25M |

### Button bit Type 23



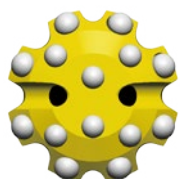
| Gauge diameter |        | Gauge angle [°] | Button × Button dia.[mm] |      | Flushing hole |      | Weight [Kg] | Part number     |
|----------------|--------|-----------------|--------------------------|------|---------------|------|-------------|-----------------|
| [mm]           | [in]   |                 | Gauge                    | Face | Side          | Face |             |                 |
| 102            | 4"     | 35              | 9×13                     | 6×13 | -             | 3    | 5.8         | 68WDPVS102R23M  |
| 115            | 4 1/2" | 35              | 9×13                     | 7×13 | -             | 3    | 7.8         | 68WDPVS115R23MS |
| 115            | 4 1/2" | 35              | 9×14                     | 7×14 | -             | 3    | 7.9         | 68WDPVS115R23M  |
| 127            | 5"     | 35              | 9×14                     | 7×14 | -             | 3    | 10.2        | 68WDPVS127R23MS |
| 127            | 5"     | 35              | 9×16                     | 7×16 | -             | 3    | 10.3        | 68WDPVS127R23M  |

### Button bit Type 55



| Gauge diameter |        | Gauge angle [°] | Button × Button dia.[mm] |            | Flushing hole |      | Weight [Kg] | Part number    |
|----------------|--------|-----------------|--------------------------|------------|---------------|------|-------------|----------------|
| [mm]           | [in]   |                 | Gauge                    | Face       | Side          | Face |             |                |
| 102            | 4"     | 35              | 8×14                     | 6×14       | -             | 4    | 5.7         | 68WDPVS102R55M |
| 115            | 4 1/2" | 35              | 8×14                     | 8×14       | -             | 4    | 7.7         | 68WDPVS115R55M |
| 127            | 5"     | 35              | 8×16                     | 4×16, 4×14 | -             | 4    | 10.1        | 68WDPVS127R55M |

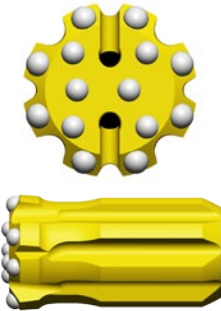
### Button bit Type 85



| Gauge diameter |        | * Gauge angle [°] | Button × Button dia.[mm] |            | Flushing hole |      | Weight [Kg] | Part number     |
|----------------|--------|-------------------|--------------------------|------------|---------------|------|-------------|-----------------|
| [mm]           | [in]   |                   | Gauge                    | Face       | Side          | Face |             |                 |
| 102            | 4"     | 20-40             | 8×12                     | 7×12       | -             | 2    | 5.6         | 68WDPVS102BB85H |
| 115            | 4 1/2" | 20-40             | 8×14                     | 8×12       | -             | 2    | 7.6         | 68WDPVS115BB85H |
| 127            | 5"     | 20-40             | 8×14                     | 4×14, 4×12 | -             | 2    | 10.0        | 68WDPVS127BB85H |

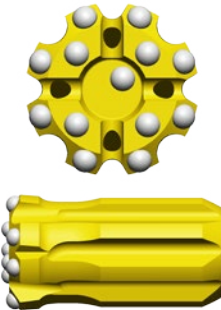
\* Face angle 20°, Gauge angle 40°

### Retrac Button bit Type 25



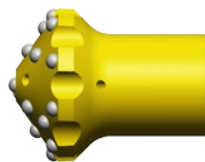
| Gauge diameter |        | Gauge angle [°] | Button × Button dia.[mm] |      | Flushing hole |      | Weight [Kg] | Part number           |
|----------------|--------|-----------------|--------------------------|------|---------------|------|-------------|-----------------------|
| [mm]           | [in]   |                 | Gauge                    | Face | Side          | Face |             |                       |
| 102            | 4"     | 35              | 8×14                     | 6×13 | -             | 2    | 6.6         | <b>68WDPVR102R25M</b> |
| 115            | 4 1/2" | 35              | 8×14                     | 7×13 | -             | 2    | 9.4         | <b>68WDPVR115R25M</b> |
| 127            | 5"     | 35              | 8×16                     | 8×14 | -             | 2    | 12.1        | <b>68WDPVR127R25M</b> |

### Retrac Button bit Type 55



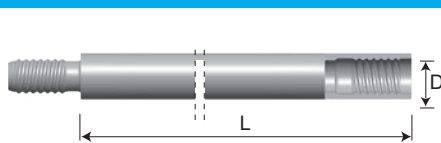
| Gauge diameter |        | Gauge angle [°] | Button × Button dia.[mm] |            | Flushing hole |      | Weight [Kg] | Part number           |
|----------------|--------|-----------------|--------------------------|------------|---------------|------|-------------|-----------------------|
| [mm]           | [in]   |                 | Gauge                    | Face       | Side          | Face |             |                       |
| 102            | 4"     | 35              | 8×14                     | 6×14       | -             | 4    | 6.4         | <b>68WDPVR102R55M</b> |
| 115            | 4 1/2" | 35              | 8×14                     | 8×14       | -             | 4    | 9.2         | <b>68WDPVR115R55M</b> |
| 127            | 5"     | 35              | 8×16                     | 4×16, 4×14 | -             | 4    | 11.8        | <b>68WDPVR127R55M</b> |

### Reaming bit integration model



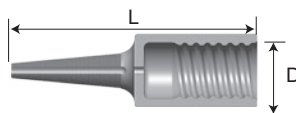
| Gauge diameter |      | Gauge angle [°] | Button × Button dia.[mm] |       | Flushing hole |      | Weight [Kg] | Part number          |
|----------------|------|-----------------|--------------------------|-------|---------------|------|-------------|----------------------|
| [mm]           | [in] |                 | Gauge                    | Face  | Side          | Face |             |                      |
| 152            | 6"   | 35              | 9×14                     | 11×14 | 3             | 1    | 11.2        | <b>WI68WDP152R-D</b> |

### Male / Female drill tube



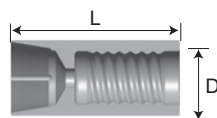
| Thread      | Outside diameter(D) |        | Length(L) |         | Weight [Kg] | Part number            |
|-------------|---------------------|--------|-----------|---------|-------------|------------------------|
|             | [mm]                | [in]   | [mm]      | [ft/in] |             |                        |
| ST68 - ST68 | 87                  | 3 1/2" | 1525      | 5'      | 39.8        | <b>GR87WD68MF-1525</b> |
|             | 87                  | 3 1/2" | 1830      | 6'      | 47.3        | <b>GR87WD68MF-1830</b> |

### Recovery pike



| Outside diameter(D) |        | Length(L) |         | Weight [Kg] | Part number          |
|---------------------|--------|-----------|---------|-------------|----------------------|
| [mm]                | [in]   | [mm]      | [in]    |             |                      |
| 88                  | 3 1/2" | 260       | 10 1/4" | 6.2         | <b>FTM-68WD-GR88</b> |

### Recovery sleeve



| Outside diameter(D) |      | Length(L) |        | Weight [Kg] | Part number          |
|---------------------|------|-----------|--------|-------------|----------------------|
| [mm]                | [in] | [mm]      | [in]   |             |                      |
| 100                 | 4"   | 225       | 8 7/8" | 7.5         | <b>FTF-68WD-GR88</b> |