Notations

$X$ = quality characteristic

$\mu$ = true process mean level

$\hat{\mu}$ = process mean estimate

$\mu'$ = standard value for the process mean

$\sigma$ = true common cause sigma

$\hat{\sigma}$ = common cause sigma estimate

$\sigma'$ = standard value for common cause sigma

$k$ = number of subgroups

$n_i$ = ith subgroup size

$X_{ij}$ = jth observation of the ith subgroup

$\bar{X}_i$ = ith subgroup arithmetic mean

$\bar{X}$ = overall mean

$S_i$ = ith subgroup standard deviation ($n-1$ in the divisor)

$\bar{S}$ = average standard deviation

$R_i$ = ith subgroup range

$\bar{R}$ = average range

$c_3$ = unbiasing constant for $S_i$ and $\bar{S}$

$d_2$ = unbiasing constant for $R_i$ and $\bar{R}$

$A_2$ = control limit factor for the $\bar{X}$ chart with $\bar{R}$ estimate

$A_3$ = control limit factor for the $\bar{X}$ chart with $\bar{S}$ estimate

$B_3$ = lower control limit factor for the S-chart

$B_4$ = upper control limit factor for the S-chart

$D_3$ = lower control limit factor for the R-chart

$D_4$ = upper control limit factor for the R-chart

$p$ = true proportion nonconforming of the process or lot

$\hat{p}$ = estimated proportion nonconforming of the process or lot

$d_i$ = the number of nonconformities or number of nonconforming units in the ith subgroup

$\hat{p}_i$ = estimated proportion nonconforming for the ith subgroup

$\bar{p}$ = overall estimate of the process proportion nonconforming

$\lambda$ = process nonconformity rate

$\hat{\lambda}$ = estimated process nonconformity rate

$\bar{c}$ = overall average number of nonconformities

$n$ = the sample size of a single sampling attribute plan

$Ac$ = the acceptance number of a single sampling attribute plan

$Re$ = the rejection number of a single sampling attribute plan
\( n_i \) = ith stage sample size
\( Ac_i \) = ith stage acceptance number
\( Re_i \) = ith stage rejection number