Clause 6.2.4 Modified Hazen-Williams Formula

The Modified Hazen Williams formula has been derived from Darcy-Weisbach and Colebrook-White equations and obviates the limitations of Hazen-Williams formula.

\[ V = 3.83C_R d^{0.6575} (gs)^{0.5525} / v^{0.105} \]

Where,
- \( C_R \) = coefficient of roughness
- \( d \) = pipe diameter
- \( g \) = acceleration due to gravity
- \( s \) = friction slope
- \( v \) = viscosity of liquid

For circular conduits, \( v_2^{0.007} \) for water \( = 10^{-6} \text{m}^2 / \text{s} \) and \( g = 9.81 \text{m} / \text{s}^2 \)

The Modified Hazen Williams formula derived as

\[ V = 143.534 C_R r^{0.6575} s^{0.5525} \]
\[ h = [L(Q / C_R)^{1.81}] / 994.62D^{4.81} \]

in which,
- \( V \) = velocity of flow in m/s.
- \( C_R \) = pipe roughness coefficient, ( 1 for smooth pipes; < 1 for rough pipes);
- \( r \) = hydraulic radius in m;
- \( s \) = friction slope;
- \( D \) = internal diameter of pipe in m;
- \( h \) = friction head loss in m;
- \( L \) = length of pipe in m; and
- \( Q \) = flow in pipe in \( \text{m}^3 / \text{s} \)