

KETIV

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```
Function GetFrontOrRearMatrix(strFlangeType As String, strFlangeEnd As String, dblVertOffset As Double, dblCustomHorOffset As Double, _
                             dblFlangeSize As Double, strSide As String, strTopOrBottom As String) As DocumentUnitsMatrix
    ' This function returns a matrix object that is derived based on all of its inputs
    ' It is only good for matrices on the front dish head plate, and the rear dish head plate, and only for end connections
    ' That includes flanges, caps and valves
    Dim matrixReturn As DocumentUnitsMatrix
    ' This variable calculates the length from the center of the tank to the outside edge of the tank body
    ' It then approximates the dish head plate depth using a linear formula (which isn't always the most accurate)
    ' The goal is to get the distance as from tank centerline to the outside edge of the tank, including the dish head plate
    Dim dblDishOffset As Double = TANK_L / 2 + (dblVertOffset / (TANK_OD / 2)) * DISH_DEPTH
    ' This uses the "GetFlangeOffsetDistance" function to get the initial offset values based on the type of end connection
    Dim dblFlangeOffset As Double = GetFlangeOffsetDistance(strFlangeType, strFlangeEnd, dblFlangeSize)
    Dim dblyYValue, dblZValue As Double
    ' We need to know if the end connection will be on the upper half of the tank, or the lower half of the tank
    ' If it's on the upper half, our Y location value will be positive
    ' If it's on the lower half, our Y location value will be negative
    If strTopOrBottom = "Top" Then
        dblyYValue = TANK_OD / 2 - dblVertOffset
    Else
        dblyYValue = -TANK_OD / 2 + dblVertOffset
    End If
    ' For "Open" end connections, calculate our Z location value, and create one matrix for the front, and one for the rear
    ' The reason front and rear placement matrices differ, is that a flange has to be rotated 180-degrees if it's placed
    ' on the rear dish head; in other words, you always want the flanges pointing away from the tanks
    If strFlangeEnd = "Open" Then
        dblZValue = dblDishOffset + dblFlangeOffset + dblCustomHorOffset - 6 in
        If strSide = "Front" Then
            matrixReturn = ThisDoc.Geometry.Matrix(0, 0, 1, 0, 0, 1, 0, dblyYValue, -1, 0, 0, dblZValue, 0, 0, 0, 1)
        Else
            matrixReturn = ThisDoc.Geometry.Matrix(0, 0, -1, 0, 0, 1, 0, dblyYValue, 1, 0, 0, -dblZValue, 0, 0, 0, 1)
        End If
    ' For "Capped" end connections, calculate our Z location value, and create one matrix for the front, and one for the rear
    ElseIf strFlangeEnd = "Capped" Then
        dblZValue = dblDishOffset + dblCustomHorOffset
        If strSide = "Front" Then
            matrixReturn = ThisDoc.Geometry.Matrix(1, 0, 0, 0, 0, 1, 0, dblyYValue, 0, 0, 1, dblZValue, 0, 0, 0, 1)
        Else
            matrixReturn = ThisDoc.Geometry.Matrix(-1, 0, 0, 0, 0, 1, 0, dblyYValue, 0, 0, -1, -dblZValue, 0, 0, 0, 1)
        End If
    ' For "Valve" end connections, calculate our Z location value, and create one matrix for the front, and one for the rear
    Else
        dblZValue = dblDishOffset + dblCustomHorOffset + 1 in
        If strSide = "Front" Then
            matrixReturn = ThisDoc.Geometry.Matrix(1, 0, 0, 0, 0, 1, 0, dblyYValue, 0, 0, 1, dblZValue, 0, 0, 0, 1)
        Else
            matrixReturn = ThisDoc.Geometry.Matrix(-1, 0, 0, 0, 0, 1, 0, dblyYValue, 0, 0, -1, -dblZValue, 0, 0, 0, 1)
        End If
    End If
    ' Set our resulting matrix to the GetFrontOrRearMatrix function so that it can be returned to our calling statement
    GetFrontOrRearMatrix = matrixReturn
End Function
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