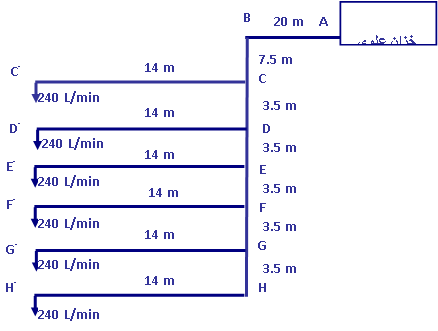
Example :

Design the water distribution system for the building that shown in figure below if the feeding is indirect and the building consists of six stories. The demand pressure at the sanitary equipment is (2 m) and the average consumption in each story is 240 L/min.



**Solution :**

1. **Find (i) for the main lines**

**For line ABCC- length (L) plus 10% of his length**

**L=(20+7.5+14)\*1.1= 41.5\*1.1= 45.65 m**

**hf =7.5-2=5.5 m**

**i= 5.5/45.67=0.12**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Lines** | **Highest (m)** | **hf (m)** | **L\*1.1** | **i** |
| **ABCC-** | **7.5** | **5.5** | **45.65** | **0.125.5/45.65=** |
| **ABDD-** | **11** | **9** | **49.50** | **0.189/49.5=** |
| **ABEE-** | **14.5** | **12.5** | **53.35** | **0.2312.5/53.35=** |
| **ABFF-** | **18** | **16** | **57.20** | **0.2816/57.2=** |
| **ABGG-** | **21.5** | **19.5** | **61.05** | **0.3219.5/61.05=** |
| **ABHH-** | **25** | **23** | **64.90** | **0.3523/64.9=** |

**Choose the minimum i =0.12**

**الخطوه التالية هي تحديد الضغط عند تفرعات التغذية عند القائم الرأسي بأستخدام ميل خط الضغط الهيدروليكي 0.12 , ثم حساب ميل خط الضغط الهيدروليكي في تفرعات التغذية**

**At point C**

**hf= 27.5\*0.12-7.5-2=2.2m**

**L= 14\*1.1=15.4**

**i=hf/L= 2.2/15.4=0.14**

**ثم يمكن حساب اقطار الأنابيب والتفرعات بأستخدام المعادلات التالية:**

**Line ABC**

**Qave=1440**

****

****

**Q= 303.6 = 304 L/min**

****



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **D(mm)** | **Q** | **Qave** | **(i)** | **Lines** |
| **54.8** | **304** | **1440** | **0.12** | **ABC** |
| **52.8** | **277** | **1200** | **0.12** | **CD** |
| **50.5** | **248** | **960** | **0.12** | **DE** |
| **47.7** | **215** | **720** | **0.12** | **EF** |
| **44** | **175** | **480** | **0.12** | **FG** |
| **38.3** | **124** | **240** | **0.12** | **GH** |
| **37** | **124** | **240** | **0.14** | **CC-** |
| **31** | **124** | **240** | **0.34** | **DD-** |
| **28.4** | **124** | **240** | **0.54** | **EE-** |
| **26.6** | **124** | **240** | **0.74** | **FF-** |
| **25.4** | **124** | **240** | **0.94** | **GG-** |
| **24.4** | **124** | **240** | **1.14** | **HH-** |

Example :

A building consisting of 6 floors, in each floor 4 units, each housing unit containing

1. bath containing: water closet, bathtub, laundry tray, wash basin
2. bath containing: water closet, lavatory, shower
3. kitchen contains: 2 kitchen sink

Calculate the design water rates (designed Q ) required for each unit, then for each floor, and for the all building?

**Solution :**

**By using Table (1)** **we fined Qave**

|  |  |  |  |
| --- | --- | --- | --- |
| **sum** | **Qave** | **Number** | **Type of sanitary equipment** |
| **18** | **9** | **2** | water closet |
| **18** | **9** | **2** | wash basin |
| **24** | **12** | **2** | kitchen sink |
| **18** | **18** | **1** | laundry tray |
| **18** | **18** | **1** | bathtub |
| **18** | **18** | **1** | shower |
| **114** | **Sum Qave** | | |

****

**Find Q for each unit=85.4 L/min**

**Find Q for each floor**

**Qave=114\*4=456 L/min**

**Q=170.8 L/min**

**Find Q** **all building**

**Qave=456\*6=2736 L/min**

**Q=418.5 L/min**