CLARK COUNTY DEPARTMENT OF BUILDING
Fire Prevention Bureau
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OTC-011
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TITLE: **OVER THE COUNTER (OTC) PLAN REVIEW**
HYDRANT TEST FOR FIRE SPRINKLER DESIGN

SCOPE: A sprinkler design flow test is needed for calculating the water supply available when designing a new sprinkler system. Sprinkler design flow tests used for sprinkler system design must be conducted within 12 months prior to submittal of the fire sprinkler permit. Sprinkler design flow tests are required to be witnessed by the fire code official. The procedures for preparing a submittal and conducting a sprinkler design flow test are provided below

Plans shall address the following:

- ☐ Submittals to include Project Address, Contractor Name, Contractor Phone Number, APN (APN on Application Form is acceptable)
- ☐ Location of fire hydrants to be used in flow test must be indicated. Indicate which hydrant is to be gauged and which hydrant is to be flowed.
- ☐ Identify the streets adjacent to the project site.
- ☐ Indicate the location of the building site associated with the hydrant test.
- ☐ Indicate the distance between the test hydrants and the building. Maximum 750 feet distance allowed.
- ☐ Indicate results to be recorded. At a minimum, the static, residual, and pitot pressures; the orifice diameter(s); and the flow achieved must be recorded. Use the attached spreadsheet (based on NFPA 291) for determination of flow. NOTE: For flow devices validated by a third-party testing agency, i.e. Hosemonster, use of manufacturer spreadsheets is acceptable.
- ☐ Flow test information must be within 12 months prior to submittal of the sprinkler system application.

Prepared By	Concurred By	Approved By
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Inspection Procedures:

- ☐ Contractor shall provide equipment for the test. Gauges shall be calibrated as required by the manufacturer.

- ☐ The gauge hydrant, as identified on the plan, shall have a gauge attached to one of the fire hydrant outlets, and the hydrant shall be opened.

- ☐ The gauge hydrant is used to determine the static pressure and the residual pressure at flow.

- ☐ The residual pressure is to be a minimum of 10 psi lower than the static pressure. Should flow from a single outlet of the flow hydrant not produce sufficient pressure drops, additional outlets on the flow hydrant are to be opened to achieve the residual pressure drop of 10 psi below static pressure. In no case is more than one flow hydrant required for this test. Where all three outlets are opened on the one flow hydrant and the residual pressure still is not 10 psi lower than the static pressure, then the minimum 10 psi pressure drop is not required.

- ☐ The flow hydrant, as identified on the plan, shall have one or more outlets opened, starting with the 2.5 inch outlets. The pitot pressures shall be measured from all open outlets, and the resulting flow calculated in accordance with NFPA 291, with corrective factors. Flows from multiple outlets must be added together. Do not add the pitot pressures to each other prior to finding the flow, use each individual pitot result to determine flow and then add the flows together. Utilize the attached spreadsheet to determine the flow rate.

- ☐ The fire inspector will witness the test and record the results on an inspection record, including static pressure, residual pressure, each outlet diameter flowed, each outlet pitot result, and each outlet flow result. A copy of the inspection record will be given to the contractor to be utilized for fire sprinkler system design. A copy of the inspection record shall be added by the fire sprinkler designer to the fire sprinkler submittal.

FIRE HYDRANT FLOW TEST

Contractor: _____

Contractor Ph (on-site contact): _____

Property Address: _____

Property APN: _____

	Street Name _____	Street Name _____
Street Name _____		
Street Name _____		

Gauge Hydrant Distance to Structure: _____ Feet

Flow Hydrant Distance to Structure: _____Feet

Gauge hydrant used to determine static pressure and the residual pressure at flow.
The flow hydrant will be opened and one or more outlet flows will be measured to determine pitot pressure. Flows will be determined by NFPA 291.

Pitot Pressure* (PSI)	Orifice Size (in.)		Pitot Pressure* (PSI)	Orifice Size (in.)	
	2.5	4		2.5	4
1	168.3	416.4	42	1088.1	2311.2
2	237.6	589.3	44	1113.3	2365.7
3	290.7	684.8	46	1138.5	2418.8
4	335.7	765.0	48	1162.8	2471.1
5	375.3	826.6	50	1187.1	2521.9
6	411.3	883.8	52	1210.5	2571.9
7	443.7	943.5	54	1233.0	2620.5
8	475.2	1008.5	56	1256.4	2669.0
9	504.0	1069.7	58	1278.0	2716.1
10	531.0	1128.0	60	1300.5	2762.4
11	557.1	1182.5	62	1322.1	2808.0
12	581.4	1235.5	64	1342.8	2853.5
13	604.8	1285.6	66	1363.5	2897.6
14	628.2	1334.1	68	1384.2	2940.9
15	649.8	1381.2	70	1404.0	2984.3
16	671.4	1426.8	72	1424.7	3026.1
17	692.1	1470.8	74	1443.6	3067.9
18	711.9	1513.4	76	1463.4	3109.0
19	731.7	1554.5	78	1482.3	3150.1
20	750.6	1594.8	80	1501.2	3189.7
22	787.5	1672.5	82	1520.1	3229.3
24	822.6	1747.2	84	1538.1	3268.9
26	855.9	1818.2	86	1557.0	3307.7
28	888.3	1886.9	88	1575.0	3345.8
30	919.8	1953.4	90	1592.1	3383.2
32	949.5	2017.6	92	1610.1	3420.5
34	978.3	2079.6	94	1627.2	3457.9
36	1007.1	2140.2	96	1644.3	3494.5
38	1035.0	2198.4	98	1661.4	3530.3
40	1062.0	2255.9	100	1678.5	3566.2

2.5” flows: $Q=29.84cd^2\sqrt{p}$ with c = .9

4” flows: use coefficient .9 and the figures from this Table 4.8.2 from NFPA 291:

Pitot Pressure (Velocity Head)	
Psi	Coefficient
2	0.97
3	0.92
4	0.89
5	0.86
6	0.84
7 and over	0.83