AQUASAFE® Fire Safety System

Uponor
5925 148th Street West

Apple Valley, MN 55124
800-321-4739

Job Name	:	HELOU RESIDENCE - Two Head Calculation (H.1 & H.9)
Drawing	:	RESIDENTIAL
Location	:	120 FENWAY STREET PORTLAND ME 04102
Remote Area	:	1
Contract	:	110812-40L
Data File	:	110812-40L Helou Residence.wx2

HYDRAULIC DESIGN INFORMATION SHEET

Name - HELOU RESIDENCE Date - 8/30/11
Location - PORTLAND ME 04102
Building - RESIDENTIAL System No. - 1
Contractor - SUCCHINIS PLUMB & HEAT Contract No. - 110812-40L
Calculated By - BRENT KOTULA CET III Drawing No. - 1
Construction: (X) Combustible ( ) Non-Combustible Ceiling Height 9'
OCCUPANCY - RESIDENTIAL

S Type of Calculation: ( )NFPA 13 Residential ( )NFPA 13R (X)NFPA 13D
Y Number of Sprinklers Flowing: ( )1 (X)2 ( )4 ( )
S ( )Other
T ( )Specific Ruling Made by Date
E
M Listed Flow at Start Point - 13 Gpm System Type
Listed Pres. at Start Point - 7.04 Psi (X) Wet ( ) Dry
D MAXIMUM LISTED SPACING 16 x 16 ( ) Deluge ( ) PreAction
E Domestic Flow Added - 0 Gpm Sprinkler or Nozzle
S Additional Flow Added - Gpm Make RELIABLE Model RFC49
I Elevation at Highest Outlet - 124 Feet Size 3/8 K-Factor 4.9
G Note: Temperature Rating 155
N

Calculation Gpm Required 26.1007 Psi Required 83.29 At Ref Pt STR
Summary C-Factor Used: Overhead 150 Underground 150

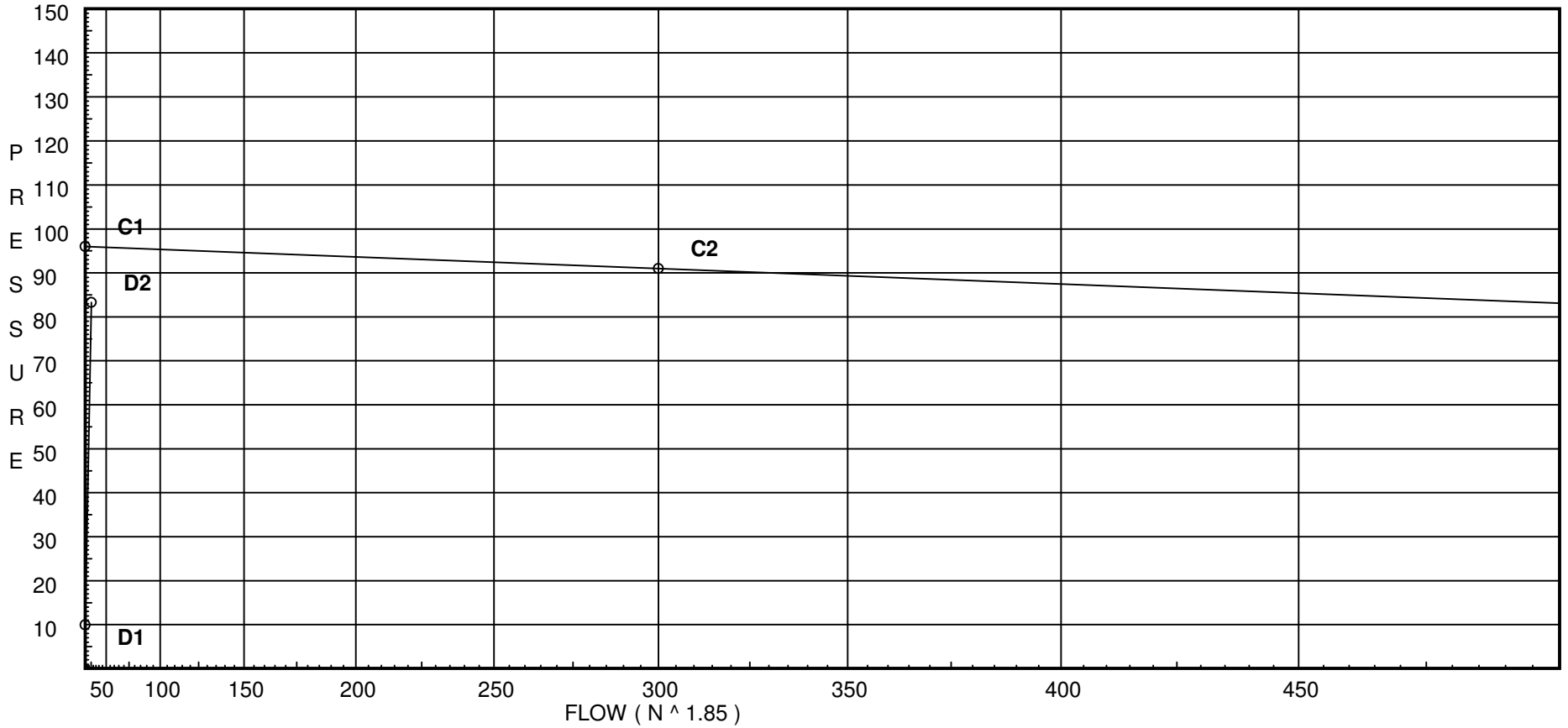
W Water Flow Test: Pump Data: Tank or Reservoir:
A Date of Test - x Rated Cap. Cap.
T Time of Test - x @ Psi Elev.
E Static (Psi) - 96 Elev.
R Residual (Psi) - 91 Other Well
Flow (Gpm) - 300 Proof Flow Gpm
S Elevation - 101

P Location: x
P
L Source of Information: CONTRACTOR
Y

City Water Supply:
- C1 - Static Pressure : 96
- C2 - Residual Pressure: 91
- C2 - Residual Flow : 300

Demand:

D1 - Elevation	:	9.961
D2 - System Flow	:	26.1007
D2 - System Pressure	:	83.290
Hose (Adj City)	:	_____
Hose (Demand)	:	_____
D3 - System Demand	:	26.1007
Safety Margin	:	12.656



Fittings Used Summary

Fitting Legend

Abbrev.	Name	½	¾	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12	14	16	18	20	24
E	90' Standard Elbow	2	2	2	3	4	5	6	7	8	10	12	14	18	22	27	35	40	45	50	61
Ec	Copper 90' Ell	1	1	2	2	2.5	3.5	4	5	6	7	9	10	0	0	0	0	0	0	0	0
G	Generic Gate Valve	1	1	1	1	1	1	1	1	1	2	2	3	4	5	6	7	8	10	11	13
T	90' Flow thru Tee	3	4	5	6	8	10	12	15	17	20	25	30	35	50	60	71	81	91	101	121
Utb	Aquapex Tee - Branch	2	6	6	9.08	12.88	13.22	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Utr	Aquapex Tee - Run	1	2	2	1.64	2.39	2.39	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Units Summary

Diameter Units	Inches
Length Units	Feet
Flow Units	US Gallons per Minute
Pressure Units	Pounds per Square Inch

SUPPLY ANALYSIS

Node at Source	Static Pressure	Residual Pressure	Flow	Available Pressure	Total Demand	Required Pressure
STR	96.0	91	300.0	95.945	26.1	83.29

NODE ANALYSIS

Node Tag	Elevation	Node Type	Pressure at Node	Discharge at Node	Notes
H.1	124.0	4.9	7.04	13.0	
H.3	124.0		7.82		
T.29	124.0		8.09		
T.38	116.0		12.1		
T.55	108.0		15.94		
H.27	108.0		16.14		
T.51	108.0		16.3		
H.24	108.0		17.09		
H.22	108.0		18.13		
T.49	108.0		19.86		
T.48	108.0		20.29		
S.1	104.0		23.1		
PRV	101.0		32.9		
MTR	100.0		43.08		
STR	101.0		83.29		
T.30	124.0		7.23		
T.36	116.0		11.91		
T.37	116.0		12.1		
H.9	124.0	4.9	7.15	13.1	
H.13	124.0		7.66		
T.33	124.0		8.06		
T.42	116.0		12.14		
T.52	108.0		16.45		
H.23	108.0		17.98		
H.21	108.0		19.4		
H.6	124.0		8.1		
H.12	124.0		8.16		
T.35	124.0		8.2		
T.34	124.0		8.23		
T.39	116.0		12.1		
T.56	108.0		15.94		
H.26	108.0		16.36		
H.2	124.0		8.13		
H.11	124.0		8.19		
T.32	116.0		11.96		
H.8	116.0		11.97		
H.15	116.0		12.01		
H.18	116.0		12.05		
T.44	116.0		12.08		
T.45	116.0		12.09		
T.43	116.0		12.1		
H.20	116.0		12.08		

NODE ANALYSIS (cont.)

Node Tag	*Elevation*	*Node Type*	*Pressure at Node*	*Discharge at Node*	*Notes*
T.47	116.0		12.1		
H.19	116.0		12.1		
T.40	116.0		12.1		
T.46	116.0		12.1		
H.17	116.0		12.1		
H.14	116.0		12.1		
H.7	116.0		12.1		
T.31	116.0		12.1		
H.10	116.0		12.1		
H.16	116.0		12.1		
H.28	108.0		15.94		
H.25	108.0		15.94		
T.50	108.0		15.94		
T.53	108.0		15.94		

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
H.1	7.76	0.862	1Utr	2.0	18.000	7.040		K Factor = 4.90
to		150.0		0.0	2.000	0.0		
H.3	7.76	0.0388		0.0	20.000	0.777		Vel = 4.27
H.3	0.0	0.862		0.0	7.000	7.817		
to		150.0		0.0	0.0	0.0		
T.29	7.76	0.0389		0.0	7.000	0.272		Vel = 4.27
T.29	-2.21	0.862	1Utb	6.0	18.000	8.089		
to		150.0	1Utr	2.0	8.000	3.465		
T.38	5.55	0.0209		0.0	26.000	0.544		Vel = 3.05
T.38	-0.28	0.862	1Utb	6.0	14.000	12.098		
to		150.0		0.0	6.000	3.465		
T.55	5.27	0.0190		0.0	20.000	0.380		Vel = 2.90
T.55	-0.13	0.862	1Utr	2.0	9.000	15.943		
to		150.0		0.0	2.000	0.0		
H.27	5.14	0.0181		0.0	11.000	0.199		Vel = 2.83
H.27	0.0	0.862	1Utr	2.0	7.000	16.142		
to		150.0		0.0	2.000	0.0		
T.51	5.14	0.0181		0.0	9.000	0.163		Vel = 2.83
T.51	6.84	0.862	1Utr	2.0	7.000	16.305		
to		150.0		0.0	2.000	0.0		
H.24	11.98	0.0869		0.0	9.000	0.782		Vel = 6.59
H.24	0.0	0.862	1Utr	2.0	10.000	17.087		
to		150.0		0.0	2.000	0.0		
H.22	11.98	0.0868		0.0	12.000	1.042		Vel = 6.59
H.22	0.0	0.862	1Utr	2.0	12.000	18.129		
to		150.0	1Utb	6.0	8.000	0.0		
T.49	11.98	0.0868		0.0	20.000	1.736		Vel = 6.59
T.49	14.12	1.245	1Ec	2.0	5.000	19.865		
to		150.0		0.0	2.000	0.0		
T.48	26.1	0.0613		0.0	7.000	0.429		Vel = 6.88
T.48	0.0	1.245	1T	5.492	12.000	20.294		
to		150.0		0.0	5.492	1.732		
S.1	26.1	0.0612		0.0	17.492	1.070		Vel = 6.88
S.1	0.0	0.745	2E	3.7	1.000	23.096		
to		150.0		0.0	3.700	6.299		* Fixed loss = 5
PRV	26.1	0.7462		0.0	4.700	3.507		Vel = 19.21
PRV	0.0	0.745		0.0	1.000	32.902		
to		150.0		0.0	0.0	9.433		* Fixed loss = 9
MTR	26.1	0.7460		0.0	1.000	0.746		Vel = 19.21
MTR	0.0	0.745	1E	1.85	48.000	43.081		
to		150.0	1T	3.7	6.475	-0.433		
STR	26.1	0.7461	1G	0.925	54.475	40.642		Vel = 19.21
	0.0							
	26.10					83.290		K Factor = 2.86
H.1	5.24	0.862	1Utr	2.0	8.000	7.040		
to		150.0		0.0	2.000	0.0		
T.30	5.24	0.0188		0.0	10.000	0.188		Vel = 2.88
T.30	3.53	0.862	2Utb	12.0	13.000	7.228		
to		150.0		0.0	12.000	3.465		
T.36	8.77	0.0488		0.0	25.000	1.220		Vel = 4.82

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
T.36	-1.87	0.862		0.0	6.000	11.913		
to		150.0		0.0	0.0	0.0		
T.37	6.9	0.0313		0.0	6.000	0.188		Vel = 3.79
T.37	-0.06	0.862	2Utb	12.0	12.000	12.101		
to		150.0		0.0	12.000	3.465		
T.51	6.84	0.0308		0.0	24.000	0.739		Vel = 3.76
	0.0							
	6.84					16.305		K Factor = 1.69
T.30	-3.53	0.862	1Utr	2.0	7.000	7.228		
to		150.0		0.0	2.000	0.0		
H.9	-3.53	-0.0090		0.0	9.000	-0.081		Vel = 1.94
H.9	13.10	0.862	1Utr	2.0	7.000	7.147		K Factor = 4.90
to		150.0		0.0	2.000	0.0		
H.13	9.57	0.0573		0.0	9.000	0.516		Vel = 5.26
H.13	0.0	0.862		0.0	7.000	7.663		
to		150.0		0.0	0.0	0.0		
T.33	9.57	0.0573		0.0	7.000	0.401		Vel = 5.26
T.33	-2.56	0.862	1Utb	6.0	11.000	8.064		
to		150.0	1Utr	2.0	8.000	3.465		
T.42	7.01	0.0322		0.0	19.000	0.612		Vel = 3.85
T.42	1.86	0.862	1Utb	6.0	11.000	12.141		
to		150.0		0.0	6.000	3.465		
T.52	8.87	0.0498		0.0	17.000	0.847		Vel = 4.88
T.52	5.25	0.862	1Utr	2.0	11.000	16.453		
to		150.0		0.0	2.000	0.0		
H.23	14.12	0.1177		0.0	13.000	1.530		Vel = 7.76
H.23	0.0	0.862	1Utr	2.0	10.000	17.983		
to		150.0		0.0	2.000	0.0		
H.21	14.12	0.1177		0.0	12.000	1.412		Vel = 7.76
H.21	0.0	0.862	1Utr	2.0	2.000	19.395		
to		150.0		0.0	2.000	0.0		
T.49	14.12	0.1175		0.0	4.000	0.470		Vel = 7.76
	0.0							
	14.12					19.865		K Factor = 3.17
T.33	2.56	0.862	1Utr	2.0	5.000	8.064		
to		150.0		0.0	2.000	0.0		
H.6	2.56	0.0050		0.0	7.000	0.035		Vel = 1.41
H.6	0.0	0.862	1Utr	2.0	11.000	8.099		
to		150.0		0.0	2.000	0.0		
H.12	2.56	0.0050		0.0	13.000	0.065		Vel = 1.41
H.12	0.0	0.862	1Utr	2.0	6.000	8.164		
to		150.0		0.0	2.000	0.0		
T.35	2.56	0.0050		0.0	8.000	0.040		Vel = 1.41
T.35	0.0	0.862		0.0	5.000	8.204		
to		150.0		0.0	0.0	0.0		
T.34	2.56	0.0050		0.0	5.000	0.025		Vel = 1.41
T.34	2.20	0.862	1Utb	6.0	18.000	8.229		
to		150.0	1Utr	2.0	8.000	3.465		
T.39	4.76	0.0157		0.0	26.000	0.409		Vel = 2.62

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
T.39	0.35	0.862	1Utb	6.0	15.000	12.103		
to		150.0		0.0	6.000	3.465		
T.56	5.11	0.0179		0.0	21.000	0.376		Vel = 2.81
T.56	0.14	0.862		0.0	22.000	15.944		
to		150.0		0.0	0.0	0.0		
H.26	5.25	0.0189		0.0	22.000	0.415		Vel = 2.89
H.26	0.0	0.862	1Utr	2.0	3.000	16.359		
to		150.0		0.0	2.000	0.0		
T.52	5.25	0.0188		0.0	5.000	0.094		Vel = 2.89
	0.0							
	5.25					16.453		K Factor = 1.29
T.29	2.20	0.862	1Utr	2.0	10.000	8.089		
to		150.0		0.0	2.000	0.0		
H.2	2.2	0.0038		0.0	12.000	0.045		Vel = 1.21
H.2	0.0	0.862	1Utr	2.0	13.000	8.134		
to		150.0		0.0	2.000	0.0		
H.11	2.2	0.0038		0.0	15.000	0.057		Vel = 1.21
H.11	0.0	0.862	1Utr	2.0	8.000	8.191		
to		150.0		0.0	2.000	0.0		
T.34	2.2	0.0038		0.0	10.000	0.038		Vel = 1.21
	0.0							
	2.20					8.229		K Factor = 0.77
T.36	1.87	0.862	1Utr	2.0	14.000	11.913		
to		150.0		0.0	2.000	0.0		
T.32	1.87	0.0028		0.0	16.000	0.045		Vel = 1.03
T.32	0.0	0.862	1Utr	2.0	3.000	11.958		
to		150.0		0.0	2.000	0.0		
H.8	1.87	0.0028		0.0	5.000	0.014		Vel = 1.03
H.8	0.0	0.862	1Utr	2.0	11.000	11.972		
to		150.0		0.0	2.000	0.0		
H.15	1.87	0.0028		0.0	13.000	0.036		Vel = 1.03
H.15	0.0	0.862	1Utr	2.0	12.000	12.008		
to		150.0		0.0	2.000	0.0		
H.18	1.87	0.0029		0.0	14.000	0.040		Vel = 1.03
H.18	0.0	0.862	1Utr	2.0	10.000	12.048		
to		150.0		0.0	2.000	0.0		
T.44	1.87	0.0028		0.0	12.000	0.033		Vel = 1.03
T.44	-0.24	0.862		0.0	2.000	12.081		
to		150.0		0.0	0.0	0.0		
T.45	1.63	0.0025		0.0	2.000	0.005		Vel = 0.90
T.45	0.24	0.862	1Utr	2.0	3.000	12.086		
to		150.0		0.0	2.000	0.0		
T.43	1.87	0.0028		0.0	5.000	0.014		Vel = 1.03
T.43	-0.01	0.862	2Utb	12.0	3.000	12.100		
to		150.0		0.0	12.000	0.0		
T.42	1.86	0.0027		0.0	15.000	0.041		Vel = 1.02
	0.0							
	1.86					12.141		K Factor = 0.53

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	******* Notes ******
T.44	0.24	0.671	1Utr	2.0	3.000	12.081		
to		150.0	1Utb	6.0	8.000	0.0		
H.20	0.24	0.0003		0.0	11.000	0.003		Vel = 0.22
H.20	0.0	0.671	1Utb	6.0	3.000	12.084		
to		150.0		0.0	6.000	0.0		
T.45	0.24	0.0002		0.0	9.000	0.002		Vel = 0.22
	0.0							
	0.24					12.086		K Factor = 0.07
T.38	0.28	0.862	2Utb	12.0	8.000	12.098		
to		150.0		0.0	12.000	0.0		
T.47	0.28	0.0001		0.0	20.000	0.002		Vel = 0.15
T.47	0.01	0.862	1Utr	2.0	8.000	12.100		
to		150.0		0.0	2.000	0.0		
H.19	0.29	0.0		0.0	10.000	0.0		Vel = 0.16
H.19	0.0	0.862	1Utr	2.0	4.000	12.100		
to		150.0		0.0	2.000	0.0		
T.40	0.29	0.0002		0.0	6.000	0.001		Vel = 0.16
T.40	0.06	0.862	2Utb	12.0	3.000	12.101		
to		150.0		0.0	12.000	0.0		
T.39	0.35	0.0001		0.0	15.000	0.002		Vel = 0.19
	0.0							
	0.35					12.103		K Factor = 0.10
T.47	-0.01	0.862		0.0	1.000	12.100		
to		150.0		0.0	0.0	0.0		
T.46	-0.01	0.0		0.0	1.000	0.0		Vel = 0.01
T.46	0.0	0.862	1Utr	2.0	6.000	12.100		
to		150.0		0.0	2.000	0.0		
H.17	-0.01	0.0		0.0	8.000	0.0		Vel = 0.01
H.17	0.0	0.862	1Utr	2.0	6.000	12.100		
to		150.0		0.0	2.000	0.0		
T.43	-0.01	0.0		0.0	8.000	0.0		Vel = 0.01
	0.0							
	-0.01					12.100		K Factor = 0
T.37	0.06	0.862	1Utr	2.0	6.000	12.101		
to		150.0		0.0	2.000	0.0		
H.14	0.06	0.0		0.0	8.000	0.0		Vel = 0.03
H.14	0.0	0.862	1Utr	2.0	9.000	12.101		
to		150.0		0.0	2.000	0.0		
H.7	0.06	0.0		0.0	11.000	0.0		Vel = 0.03
H.7	0.0	0.862	1Utr	2.0	3.000	12.101		
to		150.0		0.0	2.000	0.0		
T.31	0.06	0.0		0.0	5.000	0.0		Vel = 0.03
T.31	0.0	0.862	1Utr	2.0	14.000	12.101		
to		150.0		0.0	2.000	0.0		
H.10	0.06	0.0		0.0	16.000	0.0		Vel = 0.03
H.10	0.0	0.862	1Utr	2.0	10.000	12.101		
to		150.0		0.0	2.000	0.0		
H.16	0.06	0.0		0.0	12.000	0.0		Vel = 0.03

Hyd. Ref. Point	Qa Qt	Dia. "C" Pf/Ft	Fitting or Eqv.	Ln.	Pipe Ftng's Total	Pt Pe Pf	Pt Pv Pn	*******	Notes	******
H.16	0.0	0.862	1Utr	2.0	2.000	12.101				
to		150.0		0.0	2.000	0.0				
T.40	0.06	0.0		0.0	4.000	0.0		Vel = 0.03		
	0.0									
	0.06					12.101		K Factor = 0.02		
T.55	0.14	0.862		0.0	5.000	15.943				
to		150.0		0.0	0.0	0.0				
H.28	0.14	0.0		0.0	5.000	0.0		Vel = 0.08		
H.28	0.0	0.862	1Utr	2.0	14.000	15.943				
to		150.0		0.0	2.000	0.0				
H.25	0.14	0.0001		0.0	16.000	0.001		Vel = 0.08		
H.25	0.0	0.862	1Utr	2.0	2.000	15.944				
to		150.0		0.0	2.000	0.0				
T.50	0.14	0.0		0.0	4.000	0.0		Vel = 0.08		
T.50	0.0	0.862	1Utr	2.0	14.000	15.944				
to		150.0		0.0	2.000	0.0				
T.53	0.14	0.0		0.0	16.000	0.0		Vel = 0.08		
T.53	0.0	0.862	1Utr	2.0	5.000	15.944				
to		150.0		0.0	2.000	0.0				
T.56	0.14	0.0		0.0	7.000	0.0		Vel = 0.08		
	0.0									
	0.14					15.944		K Factor = 0.04		