City of NAPOLEON, OHIO

255 RIVERVIEW AVENUE - (419) 592-4010
NAPOLEON, OHIO 43545-0151

February 8, 1994

Mayor
Robert G. Heft

Members of Council
John E. Church, President
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James Hershberger
Sarah Peper
Terri A. Williams
Travis B. Sheaffer
Charles E. Burgoon

City Manager
Terry Dunn

Finance Director
Rupert W. Schweinhagen

Law Director
David M. Grahn

City Engineer
Marc S. Gerken

Mr. Don Wichman
Fire Tech Sprinkling Inc.
4248 Kingsmoor Dr.
Toledo, Ohio 43613

Re. Arrow Molded Plastics Expansion
800 Independence, Napoleon.

Dear Mr. Wichman

The 8" Ames 2000 DCA backflow device proposed for the fire protection system for job no. 94-001 is hereby approved as drawn. Please notify me upon installation completion so I may inspect the assembly.

The City of Napoleon requires an annual testing of backflow devices by a State of Ohio certified person/firm, to insure proper function. Please forward annual test reports to Brent N. Damman, City of Napoleon Engineering Dept. 255 W. Riverview Napoleon Ohio.

For inspection and/or questions please call me at 592-4010. between 8:00 a.m. & 5:00 p.m. Monday thru Friday.

Sincerely

Brent N Damman

Brent N Damman
Building & Zoning Adm.
Backflow Program Adm.

cc. Marc S. Gerken, City Engineer

100% recycled paper

FIRE TECH SPRINKLER, INC.
Design, Installation & Maintenance of Sprinkler Systems

4248 Kingsmoor
Toledo, Ohio 43613
(419) 472-4697

LETTER OF TRANSMITTAL

DATE 1-12-94	JOB NO. 94-001
ATTENTION Marc Gerkin	
RE: ARROW MOLDED PLASTICE	
Independence Dr.	
Napoleon, Ohio	

TO CITY OF NAPOLEON
255 Riverview Ave.
Nopoleon, Ohio 43545

WE ARE SENDING YOU ☐ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
2			Fire Protection sprinkler drawings for your review
2			Hydraulic Calculations

THESE ARE TRANSMITTED as checked below:

☐ For approval ☐ Approved as submitted ☐ Resubmit _____ copies for approval
☐ For your use ☐ Approved as noted ☐ Submit _____ copies for distribution
☐ As requested ☐ Returned for corrections ☐ Return _____ corrected prints
☐ For review and comment ☐ _____
☐ FOR BIDS DUE _____ 19 _____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS Marc: We are sending these plans for your review. Should you have any questions, changes or additions please don't hesitate to call and we will try our best to answer them. Thank you,

COPY TO R & R THREE

SIGNED: Don Wichman

If enclosures are not as noted, kindly notify us at once.

Hydraulic Design Information Sheet

Name:ARROW MOLDED PLASTICS. INC. Date:01/12/1994 System No.:TWO
Location:INDUSTRIAL/INDEPENDENCE DRIVES NAPOLEON OH. 43545
Contractor:FIRE TECH SPRINKLER. INC. Telephone: 419-472-4697
4248 KINGSMOOR DRIVE TOLEDO OH. 43613
Calculated By:D.HAYES G-085 Contract No.:
Construction: NON-COMBUSTIBLE Drawing No.:FP-2 of 3
Occupancy: MFG. & WAREHOUSE Ceiling Height:29'-0"

System Design

Code:NFPA #13 1991 Review Agency:OWNERS INSURANCE CO.

Area of Sprinkler Operation:2000
Density (gpm/sq.ft.):.45
Area Per Sprinkler:83.4SQ.FT.
Hose Allowance gpm Inside:100
Hose Allowance gpm Outside:400
Rack Sprinkler Allowance:NA

System Type:WET/GRID

Sprinkler or Nozzle
Make:ASCOA Model: "G"
Size:17/32" K-factor:8.1
Temperature Rating:280/F

Calculation Summary

Requires 1410.5 gpm at 48.72 psi at CONNECTION TO CITY MAIN
Interior C-factor:120 Underground C-factor:150

Water Supply Test Information
Test by:ARCHITECT
Date:11/22/89
Time:
Location:IN FRONT OF PROPERTY
Elevation:1.5'
Static Pressure:64.0
Residual Pressure:56.0
Flow:1396

Pump Data
Type:N/A
Elevation:N/A
Rated Psi:N/A
Rated Gpm:N/A

Tank Data
Elevation:N/A
Size:N/A

Well Proof Flow:N/A

Storage Details:

Commodity:N/A
Location:NA
Storage Height:NA
Single, Double, or Multi Row:NA
Pallet Type:NA

Class:N/A
Storage Area:NA
Clearance to Ceiling:NA
Aisle Width:NA
Encapsulated?:NA

Storage Method: %Solid Piled:NA %Palletized:NA %Rack:NA

Longitudinal Flue Spacing:NA
Horiz.Barriers Provided?:NA

Transverse Flue Spacing:NA

Donald W. Hayes
G-085

S U M M A R Y

O F

H Y D R A U L I C

C A L C U L A T I O N S

F O R

ARROW MOLDED PLASTICS, INC.

INDUSTRIAL/INDEPENDENCE DRIVES NAPOLEON OH. 43545 Job No:

Submitted By

FIRE TECH SPRINKLER, INC. 4248 KINGSMOOR DRIVE TOLEDO OH. 43613

Design Specifications		Water Supply Information		System Demand
Density :	0.450	64.00 psi @	0.00 gpm	48.72 psi
Design Area:	2000.00	56.00 psi @	1396.00 gpm	@
				1010.5 gpm
				+ 400.0 gpm Hose

Total Demand: 1410.5 gpm @ 48.72 psi

System safety factor: 7.11 psi

Notes:

List of Fitting Abbreviations

Example: "E2TC" = one Std. Elbow, two Std. Tee , and one Check Va

Code:	Description	Code:	Description	Code:	Description	Code:	Description
A :	Alarm Va	H :		O :		V :	
B :	Butt flyVa	I :		P :		W :	
C :	Check Va	J :		Q :		X :	
D :	DryPipeVa	K :		R :		Y :	
E :	Std. Elbow	L :	LongTurnEl	S :		Z :	
F :	45 Ell	M :	Deluge Va.	T :	Std. Tee		
G :	Gate Va	N :		U :			

Calcs By: D.HAYES G-085 Checked: DKH 01/12/1994 Page: 1

Ser:*310088* Hypercalc Program by Crowley Design Group, (215)-337-7060

Summary of Sprinkler and Hose Flows

Job No: ARROW MOLDED PLASTICS, INC.

Design density: .45

Supplied flow and pressure is based on 48.72 psi available at supply
(55.85 psi is actually available)

Ref. Pt.	PRESSURE Pt	Pv	Pn	K Factor	FLOW Actual	Minimum	Percent Excess	Ref. Pt.
M01	45.28		45.28	0.00	100.0	100.0	0.0%	M01
S01	22.42		22.42	8.10	38.4	37.5	2.4%	S01
S02	21.90		21.90	8.10	37.9	37.5	1.1%	S02
S03	21.65		21.65	8.10	37.7	37.5	0.5%	S03
S04	21.47		21.47	8.10	37.5	37.5	0.0%	S04
S05	21.62		21.62	8.10	37.7	37.5	0.5%	S05
S06	22.25		22.25	8.10	38.2	37.5	1.9%	S06
S07	22.44		22.44	8.10	38.4	37.5	2.4%	S07
S08	21.92		21.92	8.10	37.9	37.5	1.1%	S08
S09	21.66		21.66	8.10	37.7	37.5	0.5%	S09
S10	21.48		21.48	8.10	37.5	37.5	0.0%	S10
S11	21.63		21.63	8.10	37.7	37.5	0.5%	S11
S12	22.26		22.26	8.10	38.2	37.5	1.9%	S12
S13	22.49		22.49	8.10	38.4	37.5	2.4%	S13
S14	21.97		21.97	8.10	38.0	37.5	1.3%	S14
S15	21.71		21.71	8.10	37.7	37.5	0.5%	S15
S16	21.53		21.53	8.10	37.6	37.5	0.3%	S16
S17	21.67		21.67	8.10	37.7	37.5	0.5%	S17
S18	22.31		22.31	8.10	38.3	37.5	2.1%	S18
S19	22.61		22.61	8.10	38.5	37.5	2.7%	S19
S20	22.07		22.07	8.10	38.0	37.5	1.3%	S20
S21	21.81		21.81	8.10	37.8	37.5	0.8%	S21
S22	21.63		21.63	8.10	37.7	37.5	0.5%	S22
S23	21.77		21.77	8.10	37.8	37.5	0.8%	S23
S24	22.40		22.40	8.10	38.3	37.5	2.1%	S24

Path Summary Printout for ARROW MOLDED PLASTICS. INC.
Job No: 01/12/1994 System:TWO Drawing:FP-2 of 3

Path No: 1 Remote to Supply

Principal path

Feeds Path:2 at Pt:A02, Path:3 at Pt:A03, Path:4 at Pt:A04, Path:5 at Pt:A16

Ref Pt.	Elev. ft.	Pressure (psi) Pt	Pv	Pn	K Factor	Flow Added	(gpm) Total	Veloc fps	Diam. in.	Actual Length	Fitting Summary	Fitting Length	Total Length	Frict.Loss per.ft	Total	Elev. Psi	Loss (ft.)	Next Press	Ref Pt.
														(C=120)					
C01	22.50	29.29		29.29			-107.0	9.37	2.157	2.00	T	10.00	12.00	0.087	-1.04	-0.87	(-2.00)	27.39	D01
D01	24.50	27.39		27.39			-107.0	8.79	2.227	45.25	T	10.00	55.25	0.074	-4.09	-0.87	(-2.01)	22.42	S01
S01	26.51	22.42		22.42	8.10	38.4	-68.6	5.64	2.227	10.00			10.00	0.033	-0.33	-0.18	(-0.42)	21.90	S02
S02	26.93	21.90		21.90	8.10	37.9	-30.7	2.53	2.227	10.00			10.00	0.007	-0.07	-0.18	(-0.42)	21.65	S03
S03	27.35	21.65		21.65	8.10	37.7	6.9	0.57	2.227	10.00			10.00	0.000	0.00	-0.18	(-0.42)	21.47	S04
S04	27.77	21.47		21.47	8.10	37.5	44.5	3.65	2.227	10.00			10.00	0.015	0.15			21.62	S05
S05	27.77	21.62		21.62	8.10	37.7	82.1	6.75	2.227	10.00			10.00	0.045	0.45	0.18	(0.42)	22.25	S06
S06	27.35	22.25		22.25	8.10	38.2	120.3	9.88	2.227	65.25	T	10.00	75.25	0.092	6.92	1.24	(2.85)	30.42	B01
B01	24.50	30.42		30.42			120.3	10.54	2.157	2.00	T	10.00	12.00	0.108	1.29	0.87	(2.00)	32.57	A01
A01	22.50	32.57		32.57			120.3	1.21	6.357	8.34			8.34	0.001	0.00			32.58	A02
A02	22.50	32.58		32.58		120.3	240.6	2.43	6.357	8.34			8.34	0.002	0.02			32.59	A03
A03	22.50	32.59		32.59		120.1	360.7	3.64	6.357	8.34			8.34	0.004	0.04			32.63	A04
A04	22.50	32.63		32.63		119.6	480.3	4.84	6.357	8.34			8.34	0.007	0.06			32.69	A05
A05	22.50	32.69		32.69		41.9	522.2	5.26	6.357	8.34			8.34	0.008	0.07			32.76	A06
A06	22.50	32.76		32.76		39.9	562.1	5.67	6.357	8.34			8.34	0.010	0.08			32.84	A07
A07	22.50	32.84		32.84		38.4	600.5	6.05	6.357	8.34			8.34	0.011	0.09			32.93	A08
A08	22.50	32.93		32.93		37.3	637.8	6.43	6.357	8.34			8.34	0.012	0.10			33.03	A09
A09	22.50	33.03		33.03		36.7	674.5	6.80	6.357	8.34			8.34	0.014	0.11			33.15	A10
A10	22.50	33.15		33.15		36.5	711.0	7.17	6.357	8.34			8.34	0.015	0.12			33.27	A11
A11	22.50	33.27		33.27		36.7	747.7	7.54	6.357	8.34			8.34	0.016	0.14			33.41	A12
A12	22.50	33.41		33.41		37.3	785.0	7.91	6.357	8.34			8.34	0.018	0.15			33.56	A13
A13	22.50	33.56		33.56		38.3	823.3	8.30	6.357	4.21	T	30.00	34.21	0.020	0.67			34.22	A16
A16	22.50	34.22		34.22		87.3	910.5	9.18	6.357	39.00	AG2L	53.00	92.00	0.024	2.16	8.90	(20.50)	45.28	M01 B.O.R.
M01	2.00	45.28		45.28		100.0	1010.5	6.32	8.071	6.00	4C2GL	201.00	207.00	0.009	1.85	0.43	(1.00)	47.56	M02
														(C=150)					
M02	1.00	47.56		47.56			1010.5	6.26	8.110	160.00	GLT	78.58	238.58	0.006	1.38	-0.22	(-0.50)	48.72	M03
M03	1.50	48.72					^^^^^^												
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Path No: 2 Grid Line

Fed by path No.1

Ref Pt.	Elev. ft.	Pressure (psi) Pt	Pv	Pn	K Factor	Flow Added	(gpm) Total	Veloc fps	Diam. in.	Actual Length	Fitting Summary	Fitting Length	Total Length	Frict.Loss per.ft	Total	Elev. Psi	Loss (ft.)	Next Press	Ref Pt.
														(C=120)					
C02	22.50	29.32		29.32			-107.1	9.38	2.157	2.00	T	10.00	12.00	0.087	-1.04	-0.87	(-2.00)	27.41	D02
D02	24.50	27.41		27.41			-107.1	8.80	2.227	45.25	T	10.00	55.25	0.074	-4.10	-0.87	(-2.01)	22.44	S07
S07	26.51	22.44		22.44	8.10	38.4	-68.8	5.65	2.227	10.00			10.00	0.033	-0.33	-0.18	(-0.42)	21.92	S08
S08	26.93	21.92		21.92	8.10	37.9	-30.8	2.53	2.227	10.00			10.00	0.007	-0.07	-0.18	(-0.42)	21.66	S09
S09	27.35	21.66		21.66	8.10	37.7	6.9	0.56	2.227	10.00			10.00	0.000	0.00	-0.18	(-0.42)	21.48	S10
S10	27.77	21.48		21.48	8.10	37.5	44.4	3.65	2.227	10.00			10.00	0.015	0.15			21.63	S11
S11	27.77	21.63		21.63	8.10	37.7	82.1	6.74	2.227	10.00			10.00	0.045	0.45	0.18	(0.42)	22.26	S12
S12	27.35	22.26		22.26	8.10	38.2	120.3	9.88	2.227	65.25	T	10.00	75.25	0.092	6.92	1.24	(2.85)	30.42	B02
B02	24.50	30.42		30.42			120.3	10.53	2.157	2.00	T	10.00	12.00	0.107	1.29	0.87	(2.00)	32.58	A02
A02	22.50	32.58					^^^^^^												
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Path No: 3 Grid Line

Fed by path No.1

Ref Pt.	Elev. ft.	Pressure (psi) Pt	Pv	Pn	K Factor	Flow Added	(gpm) Total	Veloc fps	Diam. in.	Actual Length	Fitting Summary	Fitting Length	Total Length	Frict.Loss per.ft	Total	Elev. Psi	Loss (ft.)	Next Press	Ref Pt.
														(C=120)					
C03	22.50	29.42		29.42			-107.6	9.42	2.157	2.00	T	10.00	12.00	0.087	-1.05	-0.87	(-2.00)	27.50	D03
D03	24.50	27.50		27.50			-107.6	8.84	2.227	45.25	T	10.00	55.25	0.075	-4.13	-0.87	(-2.01)	22.49	S13
S13	26.51	22.49		22.49	8.10	38.4	-69.2	5.68	2.227	10.00			10.00	0.033	-0.33	-0.18	(-0.42)	21.97	S14
S14	26.93	21.97		21.97	8.10	38.0	-31.2	2.56	2.227	10.00			10.00	0.008	-0.08	-0.18	(-0.42)	21.71	S15
S15	27.35	21.71		21.71	8.10	37.7	6.5	0.54	2.227	10.00			10.00	0.000	0.00	-0.18	(-0.42)	21.53	S16
S16	27.77	21.53		21.53	8.10	37.6	44.1	3.62	2.227	10.00			10.00	0.014	0.14			21.67	S17
S17	27.77	21.67		21.67	8.10	37.7	81.8	6.72	2.227	10.00			10.00	0.045	0.45	0.18	(0.42)	22.31	S18
S18	27.35	22.31		22.31	8.10	38.3	120.1	9.86	2.227	65.25	T	10.00	75.25	0.092	6.90	1.24	(2.85)	30.44	B03
B03	24.50	30.44		30.44			120.1	10.51	2.157	2.00	T	10.00	12.00	0.107	1.29	0.87	(2.00)	32.59	A03
A03	22.50	32.59					^^^^^^												
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Path No: 4 Grid Line

Fed by path No.1

Ref Pt.	Elev. ft.	Pressure (psi) Pt	Pv	Pn	K Factor	Flow Added	(gpm) Total	Veloc fps	Diam. in.	Actual Length	Fitting Summary	Fitting Length	Total Length	Frict.Loss per.ft	Total	Elev. Psi	Loss (ft.)	Next Press	Ref Pt.
														(C=120)					
C04	22.50	29.62		29.62			-108.5	9.50	2.157	2.00	T	10.00	12.00	0.089	-1.07	-0.87	(-2.00)	27.68	D04
D04	24.50	27.68		27.68			-108.5	8.92	2.227	45.25	T	10.00	55.25	0.076	-4.20	-0.87	(-2.01)	22.61	S19
S19	26.51	22.61		22.61	8.10	38.5	-70.0	5.75	2.227	10.00			10.00	0.034	-0.34	-0.18	(-0.42)	22.07	S20
S20	26.93	22.07		22.07	8.10	38.0	-32.0	2.63	2.227	10.00			10.00	0.008	-0.08	-0.18	(-0.42)	21.81	S21
S21	27.35	21.81		21.81	8.10	37.8	5.8	0.48	2.227	10.00			10.00	0.000	0.00	-0.18	(-0.42)	21.63	S22
S22	27.77	21.63		21.63	8.10	37.7	43.5	3.57	2.227	10.00			10.00	0.014	0.14			21.77	S23
S23	27.77	21.77		21.77	8.10	37.8	81.3	6.68	2.227	10.00			10.00	0.045	0.45	0.18	(0.42)	22.40	S24
S24	27.35	22.40		22.40	8.10	38.3	119.6	9.83	2.227	65.25	T	10.00	75.25	0.091	6.85	1.24	(2.85)	30.49	B04
B04	24.50	30.49		30.49			119.6	10.48	2.157	2.00	T	10.00	12.00	0.106	1.28	0.87	(2.00)	32.63	A04
A04	22.50	32.63					^^^^^^												
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Path No: 5 Far Main

Fed by path No.1

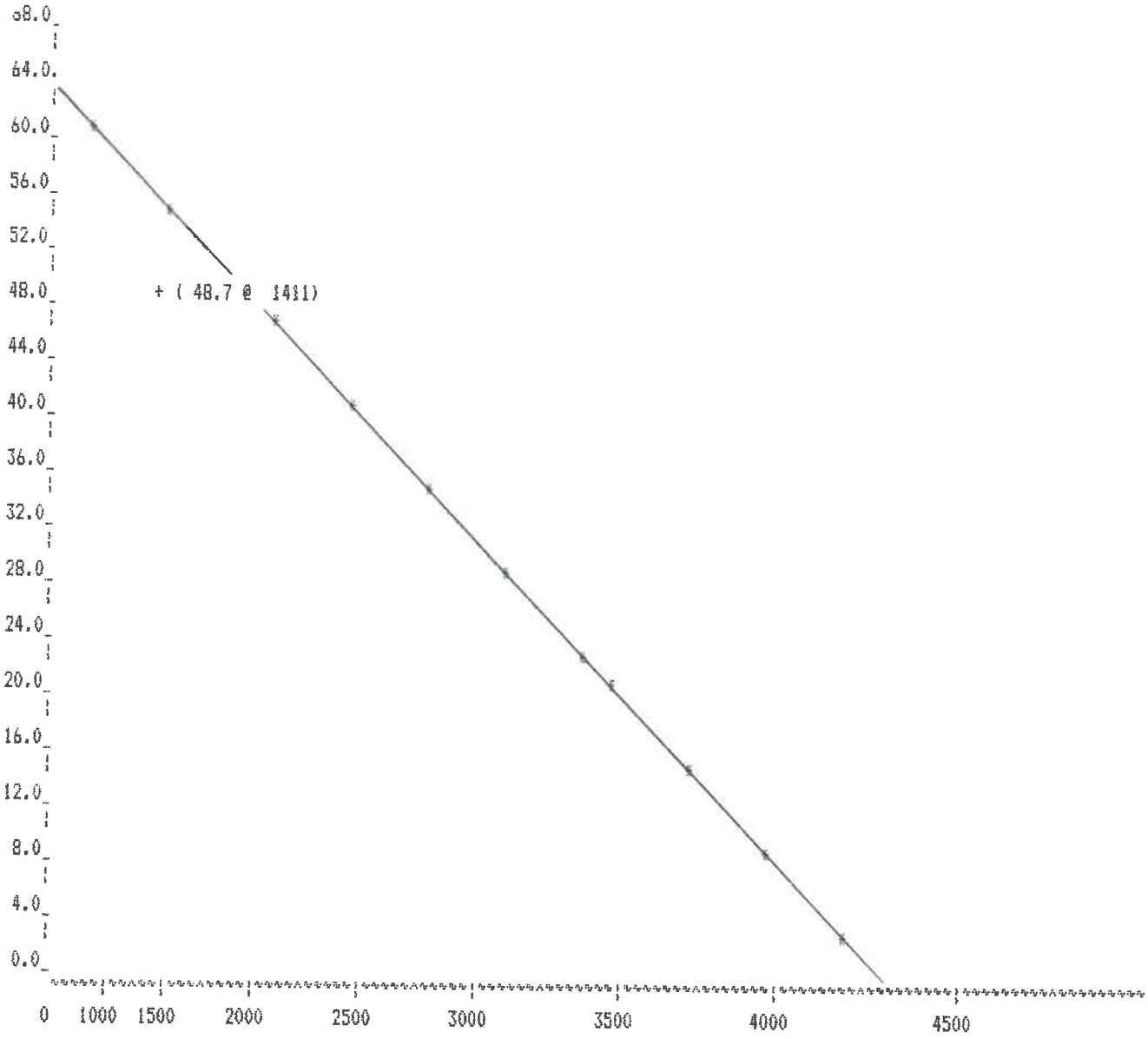
Ref Pt.	Elev. ft.	Pressure (psi) Pt	Pv	Pn	K Factor	Flow Added	(gpm) Total	Veloc fps	Diam. in.	Actual Length	Fitting Summary	Fitting Length	Total Length	Frict.Loss per.ft	Total	Elev. Psi	Loss (ft.)	Next Press	Ref Pt.
														(C=120)					
C01	22.50	29.29		29.29			107.0	2.40	4.260	8.34			8.34	0.003	0.03			29.32	C02
C02	22.50	29.32		29.32		107.1	214.1	4.81	4.260	8.34			8.34	0.011	0.09			29.42	C03
C03	22.50	29.42		29.42		107.6	321.7	7.22	4.260	8.34			8.34	0.024	0.20			29.62	C04
C04	22.50	29.62		29.62		108.5	430.2	9.66	4.260	8.34			8.34	0.041	0.34			29.96	C05
C05	22.50	29.96		29.96		-41.9	388.3	8.72	4.260	8.34			8.34	0.034	0.28			30.27	C06
C06	22.50	30.27		30.27		-39.9	348.4	7.82	4.260	8.34			8.34	0.028	0.23			30.52	C07
C07	22.50	30.52		30.52		-38.4	310.0	6.96	4.260	8.34			8.34	0.023	0.19			30.73	C08

Path Summary Printout for ARROW MOLDED PLASTICS, INC.
Job No: 01/12/1994 System:TWO Drawing:FP-2 of 3

Path No:5 (Continued) Far Main

Fed by path No.1

Ref Pt.	Elev. ft.	Pressure (psi) Pt	Pv	Pn	K Factor	Flow Added	(gpm) Total	Veloc fps	Diam. in.	Actual Length	Fitting Summary	Fitting Length	Total Length	Frict.Loss per.ft (C=120)	Total	Elev. Psi	Loss (ft.)	Next Press	Ref Pt.
C08	22.50	30.73		30.73		-37.3	272.7	6.12	4.260	8.34			8.34	0.018	0.15			30.90	C09
C09	22.50	30.90		30.90		-36.7	236.1	5.30	4.260	8.34			8.34	0.014	0.11			31.04	C10
C10	22.50	31.04		31.04		-36.5	199.6	4.48	4.260	8.34			8.34	0.010	0.08			31.14	C11
C11	22.50	31.14		31.14		-36.7	162.9	3.66	4.260	8.34			8.34	0.007	0.06			31.20	C12
C12	22.50	31.20		31.20		-37.3	125.6	2.82	4.260	8.34			8.34	0.004	0.04			31.25	C13
C13	22.50	31.25		31.25		-38.3	87.3	1.96	4.260	8.34			8.34	0.002	0.02			31.27	C14
C14	22.50	31.27		31.27		-43.7	43.6	0.98	4.260	8.34			8.34	0.001	0.00			31.27	C15
C15	22.50	31.27		31.27			43.6	3.82	2.157	2.00	T	10.00	12.00	0.016	0.20	-0.87	(-2.00)	30.61	D15
D15	24.50	30.61		30.61			43.6	3.58	2.227	160.50	TT	20.00	180.50	0.014	2.54			33.15	B15
B15	24.50	33.15		33.15			43.6	3.82	2.157	2.00	T	10.00	12.00	0.016	0.20	0.87	(2.00)	34.21	A15
A15	22.50	34.21		34.21			43.6	0.44	6.357	8.34			8.34	0.000	0.00			34.21	A14
A14	22.50	34.21		34.21		43.7	87.3	0.88	6.357	4.21	T	30.00	34.21	0.000	0.01			34.22	A16
A16	22.50	34.22					^^^^^^												
	^^^^^																		



Pressure vs. Flow

64.00	0.00
56.00	1396.00
0	4295.76

ARROW MOLDED PLASTICS, INC.
INDUSTRIAL/INDEPENDENCE DRIVES
NAPOLEON OH. 43545

Job Number:
01/12/1994

DWH

Flow Diagram for ARROW MOLDED PLASTICS, INC.

```
C01>>>>D01>>>>S01>>>>S02>>>>S03<<<<S04<<<<S05<<<<S06<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<B01<<<<A01
   107.0  107.0   68.6   30.7    6.9   44.5   82.1                                                   120.3  120.3
 ^                                                                                                             ^
107.0                                                                                                        120.3
 ^                                                                                                             ^
C02>>>>D02>>>>S07>>>>S08>>>>S09<<<<S10<<<<S11<<<<S12<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<B02<<<<A02
   107.1  107.1   68.8   30.8    6.9   44.4   82.1                                                   120.3  120.3
 ^                                                                                                             ^
214.1                                                                                                        240.6
 ^                                                                                                             ^
C03>>>>D03>>>>S13>>>>S14>>>>S15<<<<S16<<<<S17<<<<S18<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<B03<<<<A03
   107.6  107.6   69.2   31.2    6.5   44.1   81.8                                                   120.1  120.1
 ^                                                                                                             ^
321.7                                                                                                        360.7
 ^                                                                                                             ^
C04>>>>D04>>>>S19>>>>S20>>>>S21<<<<S22<<<<S23<<<<S24<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<B04<<<<A04
   108.5  108.5   70.0   32.0    5.8   43.5   81.3                                                   119.6  119.6
 ^                                                                                                             ^
430.2                                                                                                        480.3
 ^                                                                                                             ^
C05<<<<D05<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<B05<<<<A05
    41.9                                                                                              41.9   41.9
 ^                                                                                                             ^
388.3                                                                                                        522.2
 ^                                                                                                             ^
C06<<<<D06<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<B06<<<<A06
    39.9                                                                                              39.9   39.9
 ^                                                                                                             ^
348.4                                                                                                        562.1
 ^                                                                                                             ^
C07<<<<D07<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<B07<<<<A07
    38.4                                                                                              38.4   38.4
 ^                                                                                                             ^
310.0                                                                                                        600.5
 ^                                                                                                             ^
C08<<<<D08<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<B08<<<<A08
    37.3                                                                                              37.3   37.3
 ^                                                                                                             ^
272.7                                                                                                        637.8
 ^                                                                                                             ^
C09<<<<D09<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<B09<<<<A09
    36.7                                                                                              36.7   36.7
 ^                                                                                                             ^
236.1                                                                                                        674.5
 ^                                                                                                             ^
C10<<<<D10<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<B10<<<<A10
    36.5                                                                                              36.5   36.5
 ^                                                                                                             ^
199.6                                                                                                        711.0
 ^                                                                                                             ^
C11<<<<D11<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<B11<<<<A11
    36.7                                                                                              36.7   36.7
 ^                                                                                                             ^
162.9                                                                                                        747.7
 ^                                                                                                             ^
```

Flow Diagram for ARROW MOLDED PLASTICS, INC.

```
↑                                                                                                                       ↑
C12<<<<D12<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<B12<<<<A12
    37.3                                                                                                     37.3   37.3
 ^                                                                                                                       ^
125.6                                                                                                                  785.0
 ^                                                                                                                       ^
C13<<<<D13<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<B13<<<<A13
    38.3                                                                                                     38.3   38.3
 |                                                                                                                       ^
                                                                                                                       823.3
 |                                                                                                                       ^
 |                                                             M03>>>>>>>>>>>M02>>>>>>>>>>>M01>>>>>>>>>>>>>>>>>>>>>>>>>A16
                                                                        1010.5        1010.5                       910.5
 ^                                                                                                                      v
87.3                                                                                                                    87.3
 ^                                                                                                                      v
C14<<<<D14<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<B14<<<<A14
    43.7                                                                                                     43.7   43.7
 ^                                                                                                                      v
43.6                                                                                                                    43.6
 ^                                                                                                                      v
C15<<<<D15<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<B15<<<<A15
    43.6                                                                                                     43.6   43.6
```

Hydraulic Design Information Sheet

Name:ARROW MOLDED PLASTICS Date:01/12/1994 System No.:ONE
Location:INDUSTRIAL DRIVE NAPOLEON OH. 43545
Contractor:FIRE TECH SPRINKLER, INC. Telephone: 419-472-4697
4248 KINGSMOOR DRIVE TOLEDO OH. 43613
Calculated By:D. HAYES G-085 Contract No.:
Construction: Non-Combustible Drawing No.:FP-3 of 3
Occupancy: MFG. & WAREHOUSE Ceiling Height:29'-0"

System Design

Code:NFPA #13 1991 Review Agency:OWNERS INSURANCE CO.

Area of Sprinkler Operation:2000
Density (gpm/sq.ft.):.45
Area Per Sprinkler:83.4Max.
Hose Allowance gpm Inside:100
Hose Allowance gpm Outside:400
Rack Sprinkler Allowance:N/A

System Type:WET/GRID

Sprinkler or Nozzle
Make:ASCOA Model:"G"
Size:17/32" K-factor:8.1
Temperature Rating:280/F

Calculation Summary

Requires 1410.5 gpm at 50.20 psi at CONNECTION TO CITY WATER MAIN
Interior C-factor:120 Underground C-factor:150

Water Supply Test Information
Test by:ARCHITECT
Date:11/22/89
Time:
Location:IN FRONT OF RISK PROPERTY
Elevation:1.5'
Static Pressure:64
Residual Pressure:56
Flow:1396

Pump Data
Type:N/A
Elevation:N/A
Rated Psi:N/A
Rated Gpm:N/A

Tank Data
Elevation:N/A
Size:N/A

Well Proof Flow:N/A

Storage Details:

Commodity:N/A
Location:`N/A
Storage Height:N/A
Single, Double, or Multi Row:N/A
Pallet Type:N/A

Class:N/A
Storage Area:N/A
Clearance to Ceiling:N/A
Aisle Width:N/A
Encapsulated?:N/A

Storage Method: %Solid Piled:N/A %Palletized:N/A %Rack:N/A

Longitudinal Flue Spacing:N/A
Horiz.Barriers Provided?:N/A

Transverse Flue Spacing:N/A

Donald W. Hayes
G-085

S U M M A R Y

O F

H Y D R A U L I C

C A L C U L A T I O N S

F O R

ARROW MOLDED PLASTICS

INDUSTRIAL DRIVE NAPOLEON OH. 43545 Job No:

Submitted By

FIRE TECH SPRINKLER, INC. 4248 KINGSMOOR DRIVE TOLEDO OH. 43613

Design Specifications		Water Supply Information		System Demand
Density :	0.450	64.00 psi @	0.00 gpm	50.20 psi
Design Area:	2000.00	56.00 psi @	1396.00 gpm	@
				1010.5 gpm
				+ 400.0 gpm Hose

Total Demand: 1410.5 gpm @ 50.20 psi

System safety factor: 5.63 psi

Notes:

List of Fitting Abbreviations

Example: "E2TC" = one Std. Elbow, two Std. Tee , and one Check Va

Code:	Description	Code:	Description	Code:	Description	Code:	Description
A :	Alarm Va	H :		O :		V :	
B :	Butt'flyVa	I :		P :		W :	
C :	Check Va	J :		Q :		X :	
D :	DryPipeVa	K :		R :		Y :	
E :	Std. Elbow	L :	LongTurnEl	S :		Z :	
F :	45 Ell	M :		T :	Std. Tee		
G :	Gate Va	N :		U :			

Summary of Sprinkler and Hose Flows

Job No: ARROW MOLDED PLASTICS

Design density: .45

Supplied flow and pressure is based on 50.20 psi available at supply
(55.85 psi is actually available)

Ref. Pt.	PRESSURE Pt	Pv	Pn	K Factor	FLOW Actual	Minimum	Percent Excess	Ref. Pt.
M01	46.98		46.98	0.00	100.0	100.0	0.0%	M01
S01	22.42		22.42	8.10	38.4	37.5	2.4%	S01
S02	21.91		21.91	8.10	37.9	37.5	1.1%	S02
S03	21.65		21.65	8.10	37.7	37.5	0.5%	S03
S04	21.47		21.47	8.10	37.5	37.5	0.0%	S04
S05	21.62		21.62	8.10	37.7	37.5	0.5%	S05
S06	22.26		22.26	8.10	38.2	37.5	1.9%	S06
S07	22.44		22.44	8.10	38.4	37.5	2.4%	S07
S08	21.92		21.92	8.10	37.9	37.5	1.1%	S08
S09	21.66		21.66	8.10	37.7	37.5	0.5%	S09
S10	21.49		21.49	8.10	37.5	37.5	0.0%	S10
S11	21.63		21.63	8.10	37.7	37.5	0.5%	S11
S12	22.27		22.27	8.10	38.2	37.5	1.9%	S12
S13	22.49		22.49	8.10	38.4	37.5	2.4%	S13
S14	21.97		21.97	8.10	38.0	37.5	1.3%	S14
S15	21.71		21.71	8.10	37.7	37.5	0.5%	S15
S16	21.53		21.53	8.10	37.6	37.5	0.3%	S16
S17	21.68		21.68	8.10	37.7	37.5	0.5%	S17
S18	22.31		22.31	8.10	38.3	37.5	2.1%	S18
S19	22.61		22.61	8.10	38.5	37.5	2.7%	S19
S20	22.07		22.07	8.10	38.0	37.5	1.3%	S20
S21	21.81		21.81	8.10	37.8	37.5	0.8%	S21
S22	21.63		21.63	8.10	37.7	37.5	0.5%	S22
S23	21.77		21.77	8.10	37.8	37.5	0.8%	S23
S24	22.40		22.40	8.10	38.3	37.5	2.1%	S24

Path Summary Printout for ARROW MOLDED PLASTICS
Job No: 01/12/1994 System:ONE Drawing:FP-3 of 3

Path No: 1 Remote to Supply

Principal path

Feeds Path:2 at Pt:A02, Path:3 at Pt:A03, Path:4 at Pt:A04, Path:5 at Pt:A15

Ref Pt.	Elev. ft.	Pressure (psi) Pt	Pv	Pn	K Factor	Flow Added	(gpm) Total	Veloc fps	Diam. in.	Actual Length	Fitting Summary	Fitting Length	Total Length	Frict.Loss per.ft	Total	Elev. Psi	Loss (ft.)	Next Press	Ref Pt.
														(C=120)					
C01	22.50	29.28		29.28			-106.9	9.36	2.157	2.00	T	10.00	12.00	0.086	-1.04	-0.87	(-2.00	)27.38	D01
D01	24.50	27.38		27.38			-106.9	8.78	2.227	45.25	T	10.00	55.25	0.074	-4.08	-0.87	(-2.01	)22.42	S01
S01	26.51	22.42		22.42	8.10	38.4	-68.5	5.63	2.227	10.00			10.00	0.032	-0.32	-0.18	(-0.42	)21.91	S02
S02	26.93	21.91		21.91	8.10	37.9	-30.6	2.51	2.227	10.00			10.00	0.007	-0.07	-0.18	(-0.42	)21.65	S03
S03	27.35	21.65		21.65	8.10	37.7	7.1	0.58	2.227	10.00			10.00	0.000	0.00	-0.18	(-0.42	)21.47	S04
S04	27.77	21.47		21.47	8.10	37.5	44.6	3.66	2.227	10.00			10.00	0.015	0.15			21.62	S05
S05	27.77	21.62		21.62	8.10	37.7	82.3	6.76	2.227	10.00			10.00	0.046	0.46	0.18	(0.42	)22.26	S06
S06	27.35	22.26		22.26	8.10	38.2	120.5	9.90	2.227	65.25	T	10.00	75.25	0.092	6.94	1.24	(2.85	)30.44	B01
B01	24.50	30.44		30.44			120.5	10.55	2.157	2.00	T	10.00	12.00	0.108	1.29	0.87	(2.00	)32.60	A01
A01	22.50	32.60		32.60			120.5	1.21	6.357	8.34			8.34	0.001	0.00			32.60	A02
A02	22.50	32.60		32.60		120.4	240.9	2.43	6.357	8.34			8.34	0.002	0.02			32.62	A03
A03	22.50	32.62		32.62		120.2	361.1	3.64	6.357	8.34			8.34	0.004	0.04			32.65	A04
A04	22.50	32.65		32.65		119.8	480.9	4.85	6.357	8.34			8.34	0.007	0.06			32.71	A05
A05	22.50	32.71		32.71		42.3	523.2	5.27	6.357	8.34			8.34	0.008	0.07			32.79	A06
A06	22.50	32.79		32.79		40.3	563.5	5.68	6.357	8.34			8.34	0.010	0.08			32.87	A07
A07	22.50	32.87		32.87		38.8	602.3	6.07	6.357	8.34			8.34	0.011	0.09			32.96	A08
A08	22.50	32.96		32.96		37.8	640.1	6.45	6.357	8.34			8.34	0.012	0.10			33.06	A09
A09	22.50	33.06		33.06		37.2	677.3	6.83	6.357	8.34			8.34	0.014	0.11			33.17	A10
A10	22.50	33.17		33.17		37.1	714.4	7.20	6.357	8.34			8.34	0.015	0.13			33.30	A11
A11	22.50	33.30		33.30		37.3	751.7	7.58	6.357	8.34			8.34	0.016	0.14			33.44	A12
A12	22.50	33.44		33.44		38.0	789.7	7.96	6.357	8.34			8.34	0.018	0.15			33.59	A13
A13	22.50	33.59		33.59		39.0	828.6	8.35	6.357	8.34			8.34	0.020	0.16			33.75	A14
A14	22.50	33.75		33.75		40.2	868.8	8.76	6.357	8.34			8.34	0.022	0.18			33.93	A15
A15	22.50	33.93		33.93		41.7	910.5	9.18	6.357	55.00	4L	36.00	91.00	0.024	2.14			36.07	A16
A16	22.50	36.07		36.07			910.5	9.18	6.357	20.50	AGT	65.00	85.50	0.024	2.01	8.90	(20.50	)46.98	M01 B.O.R.
M01	2.00	46.98		46.98		100.0	1010.5	6.05	8.249	2.50	4C2GL	201.00	203.50	0.008	1.63	0.43	(1.00	)49.05	M02
						← INSIDE HOSE								(C=150)					
M02	1.00	49.05		49.05			1010.5	6.26	8.110	160.00	GLT	78.58	238.58	0.006	1.38	-0.22	(-0.50	)50.20	M03
M03	1.50	50.20					^^^^^^												
		^^^^^																	

Path No: 2 Grid Line

Fed by path No.1

Ref Pt.	Elev. ft.	Pressure (psi) Pt	Pv	Pn	K Factor	Flow Added	(gpm) Total	Veloc fps	Diam. in.	Actual Length	Fitting Summary	Fitting Length	Total Length	Frict.Loss per.ft	Total	Elev. Psi	Loss (ft.)	Next Press	Ref Pt.
														(C=120)					
C02	22.50	29.31		29.31			-107.0	9.37	2.157	2.00	T	10.00	12.00	0.086	-1.04	-0.87	(-2.00	)27.40	D02
D02	24.50	27.40		27.40			-107.0	8.79	2.227	45.25	T	10.00	55.25	0.074	-4.09	-0.87	(-2.01	)22.44	S07
S07	26.51	22.44		22.44	8.10	38.4	-68.6	5.64	2.227	10.00			10.00	0.033	-0.33	-0.18	(-0.42	)21.92	S08
S08	26.93	21.92		21.92	8.10	37.9	-30.7	2.52	2.227	10.00			10.00	0.007	-0.07	-0.18	(-0.42	)21.66	S09
S09	27.35	21.66		21.66	8.10	37.7	7.0	0.57	2.227	10.00			10.00	0.000	0.00	-0.18	(-0.42	)21.49	S10
S10	27.77	21.49		21.49	8.10	37.5	44.5	3.66	2.227	10.00			10.00	0.015	0.15			21.63	S11
S11	27.77	21.63		21.63	8.10	37.7	82.2	6.75	2.227	10.00			10.00	0.045	0.45	0.18	(0.42	)22.27	S12

Path No: 2 (Continued) Grid Line

Fed by path No.1

Ref Pt.	Elev. ft.	Pressure (psi) Pt	Pv	Pn	K Factor	Flow Added	(gpm) Total	Veloc fps	Diam. in.	Actual Length	Fitting Summary	Fitting Length	Total Length	Frict.Loss per.ft	Total	Elev. Psi	Loss (ft.)	Next Press	Ref Pt.
														(C=120)					
S12	27.35	22.27		22.27	8.10	38.2	120.4	9.89	2.227	65.25	T	10.00	75.25	0.092	6.94	1.24	(2.85)	30.44	B02
B02	24.50	30.44		30.44			120.4	10.54	2.157	2.00	T	10.00	12.00	0.108	1.29	0.87	(2.00)	32.60	A02
A02	22.50	32.60					^^^^^^												
		^^^^^																	

Path No: 3 Grid Line

Fed by path No.1

Ref Pt.	Elev. ft.	Pressure (psi) Pt	Pv	Pn	K Factor	Flow Added	(gpm) Total	Veloc fps	Diam. in.	Actual Length	Fitting Summary	Fitting Length	Total Length	Frict.Loss per.ft	Total	Elev. Psi	Loss (ft.)	Next Press	Ref Pt.
														(C=120)					
C03	22.50	29.40		29.40			-107.4	9.41	2.157	2.00	T	10.00	12.00	0.087	-1.05	-0.87	(-2.00)	27.49	D03
D03	24.50	27.49		27.49			-107.4	8.82	2.227	45.25	T	10.00	55.25	0.075	-4.12	-0.87	(-2.01)	22.49	S13
S13	26.51	22.49		22.49	8.10	38.4	-69.0	5.67	2.227	10.00			10.00	0.033	-0.33	-0.18	(-0.42)	21.97	S14
S14	26.93	21.97		21.97	8.10	38.0	-31.1	2.55	2.227	10.00			10.00	0.008	-0.08	-0.18	(-0.42)	21.71	S15
S15	27.35	21.71		21.71	8.10	37.7	6.7	0.55	2.227	10.00			10.00	0.000	0.00	-0.18	(-0.42)	21.53	S16
S16	27.77	21.53		21.53	8.10	37.6	44.3	3.64	2.227	10.00			10.00	0.014	0.14			21.68	S17
S17	27.77	21.68		21.68	8.10	37.7	82.0	6.73	2.227	10.00			10.00	0.045	0.45	0.18	(0.42)	22.31	S18
S18	27.35	22.31		22.31	8.10	38.3	120.2	9.88	2.227	65.25	T	10.00	75.25	0.092	6.91	1.24	(2.85)	30.46	B03
B03	24.50	30.46		30.46			120.2	10.53	2.157	2.00	T	10.00	12.00	0.107	1.29	0.87	(2.00)	32.62	A03
A03	22.50	32.62					^^^^^^												
		^^^^^																	

Path No: 4 Grid Line

Fed by path No.1

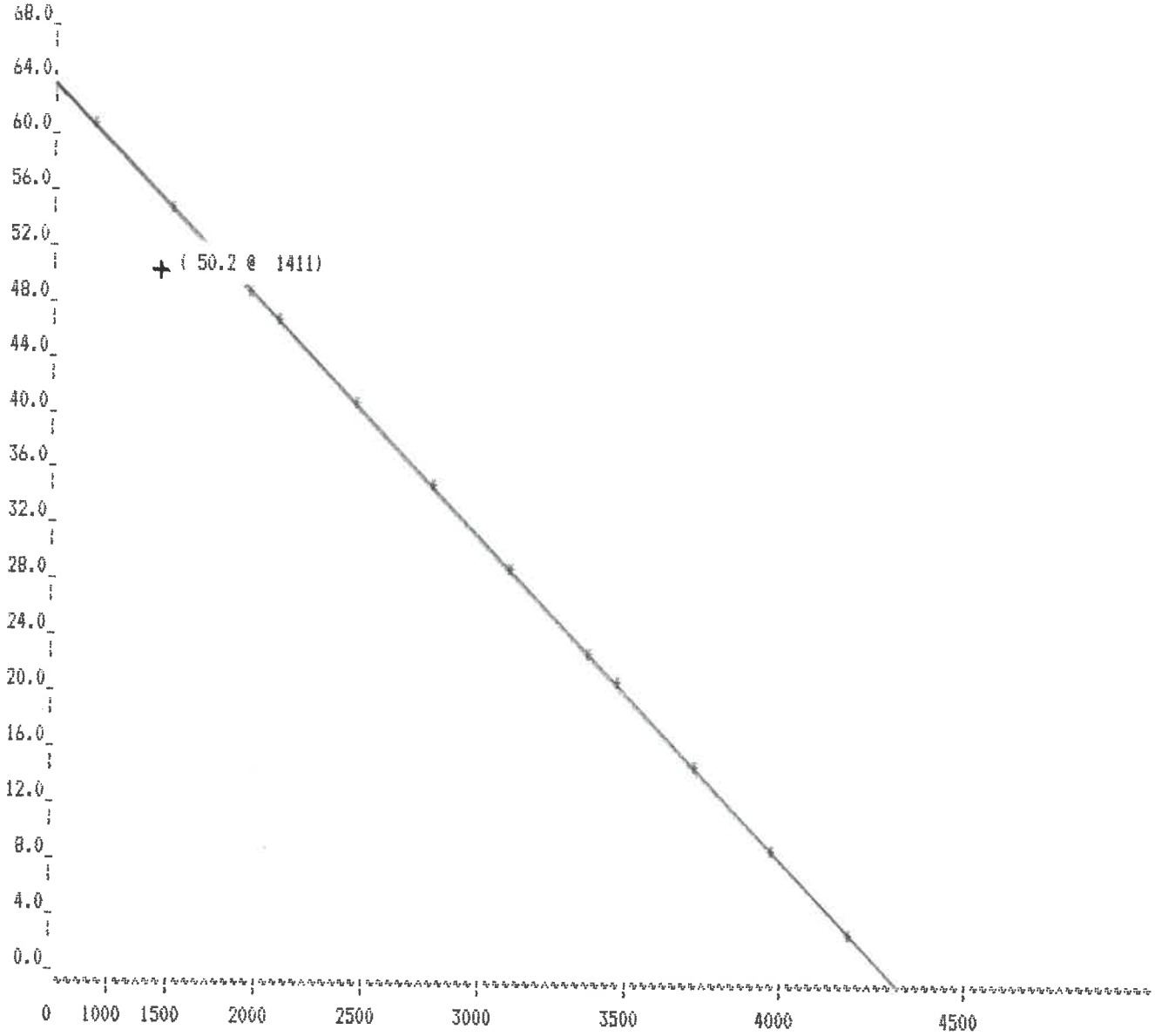
Ref Pt.	Elev. ft.	Pressure (psi) Pt	Pv	Pn	K Factor	Flow Added	(gpm) Total	Veloc fps	Diam. in.	Actual Length	Fitting Summary	Fitting Length	Total Length	Frict.Loss per.ft	Total	Elev. Psi	Loss (ft.)	Next Press	Ref Pt.
														(C=120)					
C04	22.50	29.60		29.60			-108.4	9.49	2.157	2.00	T	10.00	12.00	0.089	-1.06	-0.87	(-2.00)	27.67	D04
D04	24.50	27.67		27.67			-108.4	8.90	2.227	45.25	T	10.00	55.25	0.076	-4.19	-0.87	(-2.01)	22.61	S19
S19	26.51	22.61		22.61	8.10	38.5	-69.9	5.74	2.227	10.00			10.00	0.034	-0.34	-0.18	(-0.42)	22.07	S20
S20	26.93	22.07		22.07	8.10	38.0	-31.8	2.61	2.227	10.00			10.00	0.008	-0.08	-0.18	(-0.42)	21.81	S21
S21	27.35	21.81		21.81	8.10	37.8	6.0	0.49	2.227	10.00			10.00	0.000	0.00	-0.18	(-0.42)	21.63	S22
S22	27.77	21.63		21.63	8.10	37.7	43.7	3.59	2.227	10.00			10.00	0.014	0.14			21.77	S23
S23	27.77	21.77		21.77	8.10	37.8	81.4	6.69	2.227	10.00			10.00	0.045	0.45	0.18	(0.42)	22.40	S24
S24	27.35	22.40		22.40	8.10	38.3	119.8	9.84	2.227	65.25	T	10.00	75.25	0.091	6.87	1.24	(2.85)	30.51	B04
B04	24.50	30.51		30.51			119.8	10.49	2.157	2.00	T	10.00	12.00	0.107	1.28	0.87	(2.00)	32.65	A04
A04	22.50	32.65					^^^^^^												
		^^^^^																	

Path Summary Printout for ARROW MOLDED PLASTICS
Job No: 01/12/1994 System:ONE Drawing:FP-3 of 3

Path No: 5 Far Main

Fed by path No.1

Ref Pt.	Elev. ft.	Pressure (psi) Pt	Pv	Pn	K Factor	Flow Added	(gpm) Total	Veloc fps	Diam. in.	Actual Length	Fitting Summary	Fitting Length	Total Length	Frict.Loss per.ft	Total	Elev. Psi	Loss (ft.)	Next Press	Ref Pt.
														(C=120)					
C01	22.50	29.28		29.28			106.9	2.40	4.260	8.34			8.34	0.003	0.03			29.31	C02
C02	22.50	29.31		29.31		107.0	213.8	4.80	4.260	8.34			8.34	0.011	0.09			29.40	C03
C03	22.50	29.40		29.40		107.4	321.2	7.21	4.260	8.34			8.34	0.024	0.20			29.60	C04
C04	22.50	29.60		29.60		108.4	429.6	9.64	4.260	8.34			8.34	0.041	0.34			29.94	C05
C05	22.50	29.94		29.94		-42.3	387.4	8.70	4.260	8.34			8.34	0.034	0.28			30.25	C06
C06	22.50	30.25		30.25		-40.3	347.0	7.79	4.260	8.34			8.34	0.028	0.23			30.50	C07
C07	22.50	30.50		30.50		-38.8	308.2	6.92	4.260	8.34			8.34	0.022	0.19			30.71	C08
C08	22.50	30.71		30.71		-37.8	270.4	6.07	4.260	8.34			8.34	0.017	0.15			30.87	C09
C09	22.50	30.87		30.87		-37.2	233.2	5.24	4.260	8.34			8.34	0.013	0.11			31.00	C10
C10	22.50	31.00		31.00		-37.1	196.2	4.40	4.260	8.34			8.34	0.010	0.08			31.10	C11
C11	22.50	31.10		31.10		-37.3	158.8	3.57	4.260	8.34			8.34	0.007	0.05			31.16	C12
C12	22.50	31.16		31.16		-38.0	120.9	2.71	4.260	8.34			8.34	0.004	0.03			31.20	C13
C13	22.50	31.20		31.20		-39.0	81.9	1.84	4.260	8.34			8.34	0.002	0.02			31.22	C14
C14	22.50	31.22		31.22		-40.2	41.7	0.94	4.260	8.34			8.34	0.001	0.00			31.23	C15
C15	22.50	31.23		31.23			41.7	3.65	2.157	2.00	T	10.00	12.00	0.015	0.18	-0.87	(-2.00)	30.54	B15
B15	24.50	30.54		30.54			41.7	3.43	2.227	160.50	TT	20.00	180.50	0.013	2.34			32.88	B15
B15	24.50	32.88		32.88			41.7	3.65	2.157	2.00	T	10.00	12.00	0.015	0.18	0.87	(2.00)	33.93	A15
A15	22.50	33.93					^^^^^^												
	^^^^^																		



Pressure vs. Flow

64.00	0.00
56.00	1396.00
0	4295.76

ARROW MOLDED PLASTICS
INDUSTRIAL DRIVE
NAPOLEON OH. 43545

Job Number:
01/12/1994

DWH

Flow Diagram for ARROW MOLDED PLASTICS

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C01>>>>D01>>>>S01>>>>S02>>>>S03<<<<S04<<<<S05<<<<S06<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<B01<<<<A01
   106.9  106.9   68.5   30.6    7.1   44.6   82.3                                                   120.5  120.5
 ^                                                                                                               ^
106.9                                                                                                          120.5
 ^                                                                                                               ^
C02>>>>D02>>>>S07>>>>S08>>>>S09<<<<S10<<<<S11<<<<S12<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<B02<<<<A02
   107.0  107.0   68.6   30.7    7.0   44.5   82.2                                                   120.4  120.4
 ^                                                                                                               ^
213.8                                                                                                          240.9
 ^                                                                                                               ^
C03>>>>D03>>>>S13>>>>S14>>>>S15<<<<S16<<<<S17<<<<S18<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<B03<<<<A03
   107.4  107.4   69.0   31.1    6.7   44.3   82.0                                                   120.2  120.2
 ^                                                                                                               ^
321.2                                                                                                          361.1
 ^                                                                                                               ^
C04>>>>D04>>>>S19>>>>S20>>>>S21<<<<S22<<<<S23<<<<S24<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<B04<<<<A04
   108.4  108.4   69.9   31.8    6.0   43.7   81.4                                                   119.8  119.8
 ^                                                                                                               ^
429.6                                                                                                          480.9
 ^                                                                                                               ^
C05<<<<D05<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<B05<<<<A05
    42.3
 ^                                                                                                    42.3   42.3
                                                                                                                 ^
387.4                                                                                                          523.2
 ^                                                                                                               ^
C06<<<<D06<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<B06<<<<A06
    40.3
 ^                                                                                                    40.3   40.3
                                                                                                                 ^
347.0                                                                                                          563.5
 ^                                                                                                               ^
C07<<<<D07<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<B07<<<<A07
    38.8
 ^                                                                                                    38.8   38.8
                                                                                                                 ^
308.2                                                                                                          602.3
 ^                                                                                                               ^
C08<<<<D08<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<B08<<<<A08
    37.8
 ^                                                                                                    37.8   37.8
                                                                                                                 ^
270.4                                                                                                          640.1
 ^                                                                                                               ^
C09<<<<D09<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<B09<<<<A09
    37.2
 ^                                                                                                    37.2   37.2
                                                                                                                 ^
233.2                                                                                                          677.3
 ^                                                                                                               ^
C10<<<<D10<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<B10<<<<A10
    37.1
 ^                                                                                                    37.1   37.1
                                                                                                                 ^
196.2                                                                                                          714.4
 ^                                                                                                               ^
C11<<<<D11<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<B11<<<<A11
    37.3
 ^                                                                                                    37.3   37.3
                                                                                                                 ^
158.8                                                                                                          751.7
 ^                                                                                                               ^
```

Dkelly

Flow Diagram for ARROW MOLDED PLASTICS

```
C12<<<<D12<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<B12<<<<A12
    38.0                                                                                                    38.0   38.0
 ^                                                                                                                    ^
120.9                                                                                                                 789.7
 ^                                                                                                                    ^
C13<<<<D13<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<B13<<<<A13
    39.0                                                                                                    39.0   39.0
 ^                                                                                                                    ^
 81.9                                                                                                                 828.6
 ^                                                                                                                    ^
C14<<<<D14<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<B14<<<<A14
    40.2                                                                                                    40.2   40.2
 ^                                                                                                                    ^
 41.7                                                                                                                 868.8
 ^                                                                                                                    ^
C15<<<<D15<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<B15<<<<A15
    41.7                                                                                                    41.7   41.7
                                                                                                                      ^
                                                                                                                     910.5
                                                                                                                      ^
                                                                                                                     A16

                                                                                                                      ^
                                                                                                                     910.5
                                                                                                                      ^
                                                                                                    M02>>>>>>>>>>>>M01
                                                                                                            1010.5
                                                                                                     ^
                                                                                                    1010.5
                                                                                                     ^
                                                                                                    M03
```