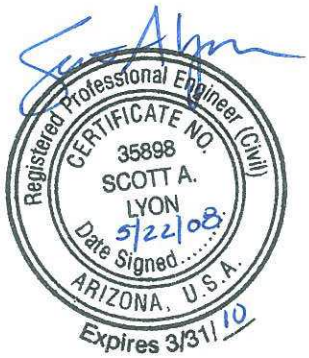
WHISPERING CANYONS P.A.D.
Phases 5-7

SEWER ANALYSIS

PREPARED FOR:
Old Capital Investments, L.L.C.
7321 N 16th Street
Phoenix, AZ 85020
(602) 889-5844



DESIGN: Brian A. Bucholtz, P.E., CFM
CHECKED: Scott A. Lyon, P.E., R.L.S.
REVISED DATE: May 19, 2008

LYON ENGINEERING
Civil Engineers • Land Surveyors

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WHISPERING CANYONS Phases 5-7, SEWER REPORT

I. PROJECT DESCRIPTION

Whispering Canyons (WC) is a master planned community located approximately 9 miles north of Prescott, Arizona, covering portions of Sections 33 & 34 of Township 16 North, Range 3 West, of the Gila and Salt River Basin. Accessed by Williamson Valley Road at the Northeast corner of the project, WC is bordered by the Inscription Canyon community to the North, Talking Rock Community to the West, the Prescott National Forest to the Southwest, and several unsubdivided parcels to the Southeast and East. WC encompasses 894 acres of rolling terrain with elevations ranging from 4755 to 5300 feet above sea level. See Exhibit 1 for vicinity map.

Phase 5 is a continuation of North Whispering Canyons Drive to the southwest and includes 28 residential lots. Phase 6 is a continuation of North Whispering Canyons Drive to the southwest and includes 41 residential lots. Phase 7 is a continuation of South Whispering Canyons Drive to the southwest and includes 36 residential lots.

II. LAND USES

Whispering Canyons will include 400 lots ranging in size from 0.5 acres to 5.2 acres. An additional lot will be provided for a community center. See Exhibit **2.**

III. OVERVIEW

The Inscription Canyon Ranch Sanitary District (ICRSD) will serve Whispering Canyons. The ICRSD currently contains an on-site sewage treatment plant with capacity above and beyond the additional capacity required for WC. See Exhibit **2** for the location of the treatment plant.

Whispering Canyons Phases 5-7 will include a total of 105 residential lots. These phases will be an extension of the sewer mains that was installed during construction of Phases 1-4. No road alignments in Phases 5-7 have changed dramatically since the original master plan, and no lots were added or removed.

All lots within WC will be serviced by a low-pressure sewer (LPS) system using Barnes pumps and design criteria, See Appendices A1, and Exhibit 2. LPS systems are based on the statistical probability of the number of individual pumps running at any given time and the average flow from each home. Peaking factors are accounted for in the LPS design. There will be two lift stations proposed, one in Phase 5 and one in Phase 7. These lift stations are described in more detail in the improvement plans. See Appendix A2 (for the Phase 5 lift station), Appendix A3 (for the Phase 7 lift station), and the improvement plans for all the specifications, including pump sizes and electrical/wiring information.

Note that a diffuser bar with a compressor for aeration will be installed in the lift stations to avoid septic conditions. This bar will run continuously (except during pump cycles) and cannot be removed from the system until pump cycles are less than 30 minutes apart per ADEQ.

Also note that an odor control system has been implemented since there are existing issues with this in previous phases. All of the odor control specifications are presented in Appendix A4 and the improvement plans. The propane generator specifications are located in Appendix A5.

The design of the lift stations has significantly changed from the overall original master plan of the wastewater collection design. The originally approved design consisted of a pre-packaged Barnes Duplex Lift Station at each of these locations (one in Phase 5 and one in Phase 7) and displayed continuity with manufacturers. Due to requirements of the ICRSD through their review engineer (Civiltec Engineering), the lift stations have been handled separately and are not manufactured by Barnes.

VI. CONCLUSION

Off-site improvements are currently completed and in operation, which service Whispering Canyons. These improvements were design for a total of 401 residential lots, of which after Phases 5-7 there will be a total of 280. To maintain an accurate analysis of the system, these phases were modeled using the manufacturers' design guidelines. As future phases are developed, updates will be provided. Any changes to this report will be submitted in addendum form to the Yavapai County Environmental Services Department.

SECTION 1 – LOW PRESSURE SEWER (LPS) DESIGN

DESIGN CRITERIA:

The ADEQ Engineering Bulletin No. 11 was used for all design criteria as follows:

Capita per Dwelling Unit: 2.5 persons (single family home)

Flow per Capita: 100 gpd (gallons per day)

Peaking Factor: Peaking factors were not used in the design of the low-pressure sewer since the Barnes LPS software adjusts for the maximum number of pumps running at any point in time based on the number of homes on the system and the design flow.

Number of Lots: 401*

(* - Note: WC contains 400 single-family lots and 1 tract for a future community center. For ease of calculation the community center was calculated as a single family home. This figure is conservative since the community center will have less than the Average Daily Flow of a home.)

SECTION 2 – LIFT STATION PUMP DESIGNS

DESIGN CRITERIA:

Barnes' formula is #Lots * 0.625 + 20 = gpm

Phase 5 Lift Station: 97 lots * 0.625 + 20 = 80.625 gpm
Head from Design = 146.68 feet
2 Flygt CP3127SH (162mm Impeller) pumps proposed

Phase 7 Lift Station: 9 lots * 0.625 + 20 = 25.625 gpm
Head from Design = 159.61 feet
2 Aurora SPGH/G2HX750 (6.87" Impeller) pumps proposed

SECTION 3 – LIFT STATION WET WELL DESIGNS

Phase 5 Lift Station:

Volume of Wet Well Required = $V_W = \frac{\theta q}{4}$ (per ADEQ)

θ = 15 minutes minimum (per ADEQ criteria), **Use 20 minutes**

$$V_W = \frac{\theta q}{4} = \frac{(20)(80.625)}{4} = \boxed{\textbf{403.125 gallons ~ 53.89 cf}}$$

Using a 6' Diameter Manhole solve for usable storage required:

$\pi r^2 = (3.14)(3)^2 = 28.27$ sf

Depth: 53.89 cf ÷ 28.27 sf = 1.91 ft

Use 2 ft of retention + 1.5 ft of submersible depth

Phase 7 Lift Station:

Volume of Wet Well Required = $V_W = \frac{\theta q}{4}$ (per ADEQ)

θ = 15 minutes minimum (per ADEQ criteria), **Use 20 minutes**

$$V_W = \frac{\theta q}{4} = \frac{(20)(25.625)}{4} = \boxed{\textbf{128.125 gallons ~ 17.13 cf}}$$

Using a 4' Diameter Manhole solve for usable storage required:

$\pi r^2 = (3.14)(2)^2 = 12.57$ sf

Depth: 17.13 cf ÷ 12.57 sf = 1.36 ft

Use 1.5 ft of retention + 1.5 ft of submersible depth

APPENDIX
Sewer Analysis

A1) Low Pressure Sewer Design

A2) Phase 5 LPS Lift Station Specifications

A3) Phase 7 LPS Lift Station Specifications

A4) Odor Control System Specifications

A5) Propane Generator Specifications

A1) Low Pressure Sewer Design

BARNES PRESSURE SYSTEMS

Barnes Pumps Inc.
420 Third Street
Piqua, Ohio 45356

www.Barnes-PS.com

Project Location: Whispering Canyons

Project Name: Prescott, AZ

Assumptions: AN + B = Q
Gal./EDU= 250
A= 0.625 Constant
N= EDU's Number of EDU's on a given pipe segment
B= 20 GPM for one pump
Pipe Type: PVC SCH 40

Hazen-Williams "C" Factor: 150

PIPE SEGMENT NUMBER	FLOWS INTO SEGMENT	NUMBER OF (EDU's)	ACCUM EDU's CONNECTED	LOW DATUM in Segment	CONTROL DATUM of Segment	PIPE LENGTH (FEET)	MAX FLOW (GAL/MIN)	PIPE SIZE (INCH)	PIPE ID (INCHES)	MAX VELOCITY (FT/SEC)	FRICTION FACTOR (FT/C.FT)	FR LOSS THIS PIPE (FEET)	ACCUM FL (FEET)	MAX HEAD REQUIRED (FEET)	PIPE SEGMENT NUMBER	SEGMENT RETENTION TIME	HOURS TO DISCHARGE
1	4	1	1	4992	5010	238	20.63	2.00	2.05	2.01	0.82	1.94	46.06	64.06	1	3.91	6.50
2	3	3	3	4930	5010	607	21.88	2.00	2.05	2.13	0.91	5.52	54.80	134.80	2	3.33	7.25
3	4	3	6	4964	5010	487	23.75	2.00	2.05	2.31	1.06	5.16	49.28	95.28	3	1.33	3.92
4	12	0	7	5000	5010	532	24.38	2.00	2.05	2.37	1.11	5.92	44.12	54.12	4	1.25	2.59
5	6	3	3	4920	5010	367	21.88	2.00	2.05	2.13	0.91	3.34	52.96	142.96	5	2.01	5.36
6	12	5	8	4947	5010	980	25.00	2.00	2.05	2.43	1.17	11.42	49.62	112.62	6	2.01	3.35
7	8	3	3	4988	5010	129	21.88	2.00	2.05	2.13	0.91	1.17	43.76	65.76	7	0.71	2.84
8	11	2	5	4964	5010	172	23.13	2.00	2.05	2.25	1.01	1.74	42.59	88.59	8	0.57	2.14
9	10	3	3	4956	5010	73	21.88	2.00	2.05	2.13	0.91	0.66	46.66	100.66	9	0.40	2.88
10	11	5	8	4938	5010	441	25.00	2.00	2.05	2.43	1.17	5.14	45.99	117.99	10	0.91	2.48
11	12	0	13	5000	5010	183	28.13	2.00	2.05	2.74	1.45	2.65	40.85	50.85	11	0.23	1.57
12	16	0	28	5000	5010	813	37.50	2.00	2.05	3.65	2.47	20.08	38.20	48.20	12	0.48	1.34
13	14	3	3	4932	5010	168	21.88	2.00	2.05	2.13	0.91	1.53	30.16	108.16	13	0.92	3.33
14	15	6	9	4894	5010	757	25.63	2.00	2.05	2.49	1.22	9.24	28.63	144.63	14	1.38	2.41
15	16	1	10	4934	5010	100	26.25	2.00	2.05	2.56	1.28	1.28	19.39	95.39	15	0.16	1.03
16	25	0	38	5000	5010	922	43.75	2.50	2.44	2.99	1.39	12.82	18.12	28.12	16	0.57	0.86
17	18	3	3	4950	5010	209	21.88	2.00	2.05	2.13	0.91	1.90	18.80	78.80	17	1.15	3.14
18	21	2	5	4982	5010	384	23.13	2.00	2.05	2.25	1.01	3.87	16.90	44.90	18	1.26	2.00
19	20	3	3	5000	5010	114	21.88	2.00	2.05	2.13	0.91	1.04	16.58	26.58	19	0.62	2.01
20	21	3	6	4982	5010	238	23.75	2.00	2.05	2.31	1.06	2.52	15.54	43.54	20	0.65	1.39
21	25	6	17	4982	5010	455	30.63	2.00	2.05	2.98	1.70	7.72	13.02	41.02	21	0.44	0.73
22	23	3	3	4984	5010	137	21.88	2.00	2.05	2.13	0.91	1.25	19.94	45.94	22	0.75	2.62
23	24	6	9	5000	5010	605	25.63	2.00	2.05	2.49	1.22	7.38	18.69	28.69	23	1.10	1.87
24	25	5	14	4986	5010	398	28.75	2.00	2.05	2.80	1.51	6.01	11.31	35.31	24	0.47	0.76
25	0	0	69	5000	5010	560	63.13	3.00	3.04	2.79	0.95	5.30	5.30	15.30	25	0.29	0.29
26	27	3	3	5060	5102	98	21.88	2.00	2.05	2.13	0.91	0.89	78.69	120.69	26	0.54	4.14
27	28	6	9	5022	5102	397	25.63	2.00	2.05	2.49	1.22	4.84	77.80	157.80	27	0.72	3.60
28	29	9	18	5004	5102	673	31.25	2.00	2.05	3.04	1.76	11.86	72.95	170.95	28	0.61	2.87
29	30	1	19	5000	5102	116	31.88	2.00	2.05	3.10	1.83	2.12	61.10	163.10	29	0.10	2.26
30	45	0	19	5000	5102	235	31.88	2.00	2.05	3.10	1.83	4.30	58.98	160.98	30	0.20	2.16
31	32	3	3	4996	5008	113	21.88	2.00	2.05	2.13	0.91	1.03	30.29	42.29	31	0.62	2.35
32	35	4	7	4988	5008	331	24.38	2.00	2.05	2.37	1.11	3.68	29.26	49.26	32	0.78	1.73
33	34	3	3	4978	5008	177	21.88	2.00	2.05	2.13	0.91	1.61	28.10	58.10	33	0.97	2.31

				150											Pipe Type:		PVC SCH 40
PIPE SEGMENT NUMBER	FLOWS INTO SEGMENT	NUMBER OF (EDU's)	ACCUM EDU's CONNECTED	LOW DATUM in Segment	CONTROL DATUM of Segment	PIPE LENGTH (FEET)	MAX FLOW (GAL/MIN)	PIPE SIZE (INCH)	PIPE ID (INCHES)	MAX VELOCITY (FT/SEC)	FRICTION FACTOR (FT/C.FT)	FR LOSS THIS PIPE (FEET)	ACCUM FL (FEET)	MAX HEAD REQUIRED (FEET)	PIPE SEGMENT NUMBER	SEGMENT RETENTION TIME	HOURS TO DISCHARGE
34	35	1	4	4980	5008	95	22.50	2.00	2.05	2.19	0.96	0.91	26.49	54.49	34	0.39	1.34
35	36	7	18	4986	5008	661	31.25	2.00	2.05	3.04	1.76	11.65	25.58	47.58	35	0.60	0.95
36	39	1	19	5004	5008	42	31.88	2.00	2.05	3.10	1.83	0.77	13.93	17.93	36	0.04	0.35
37	38	3	3	5022	5022	116	21.88	2.00	2.05	2.13	0.91	1.06	16.38	16.38	37	0.64	1.65
38	39	2	5	5016	5016	214	23.13	2.00	2.05	2.25	1.01	2.16	15.32	15.32	38	0.70	1.02
39	0	4	28	5002	5008	533	37.50	2.00	2.05	3.65	2.47	13.16	13.16	19.16	39	0.31	0.31
40	46	0	116	5084	5102	776	92.50	3.00	3.04	4.08	1.92	14.90	47.17	65.17	40	0.24	1.83
41	40	4	4	5015	5102	354	22.50	2.00	2.05	2.19	0.96	3.39	50.57	137.57	41	1.45	3.29
42	44	6	9	5032	5102	421	25.63	2.00	2.05	2.49	1.22	5.14	40.20	110.20	42	0.77	2.72
43	42	3	3	5052	5102	112	21.88	2.00	2.05	2.13	0.91	1.02	41.22	91.22	43	0.61	3.33
44	46	1	10	5040	5102	219	26.25	2.00	2.05	2.56	1.28	2.79	35.06	97.06	44	0.36	1.95
45	40	0	116	5010	5102	391	92.50	3.00	3.04	4.08	1.92	7.51	54.68	146.68	45	0.12	1.96
46	56	0	130	5084	5102	480	101.25	4.00	4.00	2.59	0.60	2.89	32.27	50.27	46	0.23	1.59
47	48	3	3	5010	5102	210	21.88	2.00	2.05	2.13	0.91	1.91	44.36	136.36	47	1.15	4.12
48	51	1	4	5010	5102	144	22.50	2.00	2.05	2.19	0.96	1.38	42.45	134.45	48	0.59	2.97
49	50	3	3	5018	5102	128	21.88	2.00	2.05	2.13	0.91	1.16	43.65	127.65	49	0.70	3.68
50	51	1	4	5032	5102	147	22.50	2.00	2.05	2.19	0.96	1.41	42.48	112.48	50	0.60	2.98
51	52	1	9	5012	5102	215	25.63	2.00	2.05	2.49	1.22	2.62	41.07	131.07	51	0.39	2.37
52	55	1	10	5018	5102	154	26.25	2.00	2.05	2.56	1.28	1.96	38.45	122.45	52	0.25	1.98
53	54	3	3	5040	5102	123	21.88	2.00	2.05	2.13	0.91	1.12	38.86	100.86	53	0.67	2.94
54	55	1	4	5030	5102	131	22.50	2.00	2.05	2.19	0.96	1.26	37.74	109.74	54	0.54	2.27
55	56	4	18	5038	5102	403	31.25	2.00	2.05	3.04	1.76	7.10	36.48	100.48	55	0.37	1.73
56	61	0	148	5084	5102	480	112.50	4.00	4.00	2.88	0.73	3.51	29.38	47.38	56	0.20	1.36
57	58	3	3	5048	5102	146	21.88	2.00	2.05	2.13	0.91	1.33	34.42	88.42	57	0.80	3.07
58	60	3	6	5048	5102	197	23.75	2.00	2.05	2.31	1.06	2.09	33.10	87.10	58	0.54	2.27
59	60	3	3	5028	5102	246	21.88	2.00	2.05	2.13	0.91	2.24	33.25	107.25	59	1.35	3.08
60	61	2	11	5036	5102	385	26.88	2.00	2.05	2.62	1.33	5.13	31.01	97.01	60	0.58	1.73
61	73	0	159	5084	5102	521	119.38	4.00	4.00	3.05	0.82	4.25	25.88	43.88	61	0.21	1.16
62	63	3	3	4986	5102	100	21.88	2.00	2.05	2.13	0.91	0.91	83.76	199.76	62	0.55	5.01
63	64	6	9	4996	5102	992	25.63	2.00	2.05	2.49	1.22	12.10	82.85	188.85	63	1.81	4.46
64	69	5	14	5012	5102	500	28.75	2.00	2.05	2.80	1.51	7.55	70.75	160.75	64	0.59	2.65
65	66	3	3	5000	5102	238	21.88	2.00	2.05	2.13	0.91	2.17	88.91	190.91	65	1.30	5.08
66	67	6	9	5030	5102	450	25.63	2.00	2.05	2.49	1.22	5.49	86.74	158.74	66	0.82	3.78
67	68	9	18	5032	5102	842	31.25	2.00	2.05	3.04	1.76	14.84	81.25	151.25	67	0.77	2.96
68	69	3	21	5084	5102	164	33.13	2.00	2.05	3.22	1.96	3.22	66.42	84.42	68	0.13	2.19
69	72	1	36	5060	5102	187	42.50	2.00	2.05	4.14	3.11	5.82	63.20	105.20	69	0.09	2.06
70	71	3	3	5030	5102	127	21.88	2.00	2.05	2.13	0.91	1.16	60.14	132.14	70	0.70	3.20
71	72	2	5	5044	5102	160	23.13	2.00	2.05	2.25	1.01	1.61	58.99	116.99	71	0.53	2.50
72	73	6	47	5058	5102	2055	49.38	2.50	2.44	3.37	1.74	35.75	57.37	101.37	72	1.02	1.98
73	76	0	206	5084	5102	412	148.75	4.00	4.00	3.80	1.23	5.05	21.63	39.63	73	0.13	0.95
74	75	3	3	5066	5102	146	21.88	2.00	2.05	2.13	0.91	1.33	21.37	57.37	74	0.80	2.52
75	76	3	6	5062	5102	327	23.75	2.00	2.05	2.31	1.06	3.47	20.04	60.04	75	0.90	1.72
76	129	0	212	5084	5102	616	152.50	4.00	4.00	3.90	1.28	7.91	16.58	34.58	76	0.18	0.83

				150											Pipe Type:		PVC SCH 40
PIPE SEGMENT NUMBER	FLOWS INTO SEGMENT	NUMBER OF (EDU's)	ACCUM EDU's CONNECTED	LOW DATUM in Segment	CONTROL DATUM of Segment	PIPE LENGTH (FEET)	MAX FLOW (GAL/MIN)	PIPE SIZE (INCH)	PIPE ID (INCHES)	MAX VELOCITY (FT/SEC)	FRICTION FACTOR (FT/C.FT)	FR LOSS THIS PIPE (FEET)	ACCUM FL (FEET)	MAX HEAD REQUIRED (FEET)	PIPE SEGMENT NUMBER	SEGMENT RETENTION TIME	HOURS TO DISCHARGE
77	0	3	3	5010	5074	916	21.88	2.00	2.05	2.13	0.91	8.34	8.34	72.34	77	5.02	5.02
78	79	8	9	5080	5134	1020	25.63	2.00	2.05	2.49	1.22	12.44	103.80	157.80	78	1.86	5.46
79	83	4	13	5120	5134	751	28.13	2.00	2.05	2.74	1.45	10.89	91.35	105.35	79	0.95	3.59
80	81	3	3	4996	5062	150	21.88	2.00	2.05	2.13	0.91	1.37	7.05	73.05	80	0.82	1.67
81	0	6	9	5014	5062	466	25.63	2.00	2.05	2.49	1.22	5.69	5.69	53.69	81	0.85	0.85
82	83	4	13	5062	5134	493	28.13	2.00	2.05	2.74	1.45	7.15	87.61	159.61	82	0.62	3.27
83	92	1	27	5134	5134	524	36.88	2.00	2.05	3.59	2.39	12.55	80.47	80.47	83	0.32	2.65
84	85	3	3	5160	5230	303	21.88	2.00	2.05	2.13	0.91	2.76	100.16	170.16	84	1.66	6.85
85	86	6	9	5174	5230	1137	25.63	2.00	2.05	2.49	1.22	13.87	97.41	153.41	85	2.08	5.19
86	91	2	11	5184	5184	324	26.88	2.00	2.05	2.62	1.33	4.32	83.53	83.53	86	0.48	3.12
87	88	3	3	5138	5166	360	21.88	2.00	2.05	2.13	0.91	3.28	92.91	120.91	87	1.97	6.23
88	90	4	7	5156	5166	417	24.38	2.00	2.05	2.37	1.11	4.64	89.64	99.64	88	0.98	4.26
89	90	3	3	5130	5166	440	21.88	2.00	2.05	2.13	0.91	4.00	89.01	125.01	89	2.41	5.69
90	91	1	11	5166	5166	434	26.88	2.00	2.05	2.62	1.33	5.78	85.00	85.00	90	0.65	3.28
91	92	4	26	5152	5160	487	36.25	2.00	2.05	3.53	2.32	11.30	79.22	87.22	91	0.31	2.63
92	109	2	55	5134	5134	1587	54.38	2.50	2.44	3.72	2.08	33.01	67.92	67.92	92	0.68	2.33
93	94	3	3	5042	5116	158	21.88	2.00	2.05	2.13	0.91	1.44	43.76	117.76	93	0.87	3.54
94	95	6	9	5048	5116	429	25.63	2.00	2.05	2.49	1.22	5.23	42.32	110.32	94	0.78	2.68
95	109	2	11	5066	5116	163	26.88	2.00	2.05	2.62	1.33	2.17	37.09	87.09	95	0.24	1.89
96	99	2	2	5168	5250	680	21.25	2.00	2.05	2.07	0.86	5.87	80.15	162.15	96	5.59	9.98
97	98	3	3	5172	5250	612	21.88	1.50	1.59	3.52	3.10	18.96	94.99	172.99	97	2.03	7.16
98	99	1	4	5210	5250	182	22.50	2.00	2.05	2.19	0.96	1.75	76.03	116.03	98	0.75	5.14
99	102	2	8	5218	5250	539	25.00	2.00	2.05	2.43	1.17	6.28	74.29	106.29	99	1.11	4.39
100	101	3	3	5192	5250	519	21.88	2.00	2.05	2.13	0.91	4.72	81.10	139.10	100	2.84	7.60
101	102	5	8	5204	5250	718	25.00	2.00	2.05	2.43	1.17	8.37	76.37	122.37	101	1.48	4.76
102	105	0	16	5205	5250	138	30.00	2.00	2.05	2.92	1.63	2.25	68.01	113.01	102	0.14	3.28
103	104	3	3	5222	5250	244	21.88	2.00	2.05	2.13	0.91	2.22	70.50	98.50	103	1.34	5.30
104	105	2	5	5234	5250	251	23.13	2.00	2.05	2.25	1.01	2.53	68.28	84.28	104	0.83	3.97
105	108	2	23	5222	5250	477	34.38	2.00	2.05	3.35	2.10	10.03	65.75	93.75	105	0.34	3.14
106	107	3	3	5180	5220	393	21.88	2.00	2.05	2.13	0.91	3.58	70.11	110.11	106	2.15	6.86
107	108	5	8	5164	5220	927	25.00	2.00	2.05	2.43	1.17	10.80	66.53	122.53	107	1.90	4.70
108	109	3	34	5200	5220	1669	41.25	2.50	2.44	2.82	1.25	20.81	55.72	75.72	108	1.15	2.80
109	112	0	100	5116	5116	537	82.50	3.00	3.04	3.64	1.55	8.34	34.91	34.91	109	0.19	1.65
110	111	3	3	5132	5132	157	21.88	2.00	2.05	2.13	0.91	1.43	35.15	35.15	110	0.86	3.39
111	112	6	9	5110	5116	586	25.63	2.00	2.05	2.49	1.22	7.15	33.72	39.72	111	1.07	2.53
112	117	0	109	5116	5116	507	88.13	3.00	3.04	3.89	1.76	8.90	26.57	26.57	112	0.17	1.46
113	114	3	3	5058	5116	128	21.88	2.00	2.05	2.13	0.91	1.16	35.33	93.33	113	0.70	3.21
114	115	6	9	5064	5116	316	25.63	2.00	2.05	2.49	1.22	3.86	34.17	86.17	114	0.58	2.51
115	116	9	18	5054	5116	623	31.25	2.00	2.05	3.04	1.76	10.98	30.31	92.31	115	0.57	1.94
116	117	1	19	5106	5116	91	31.88	2.00	2.05	3.10	1.83	1.66	19.33	29.33	116	0.08	1.37
117	119	0	128	5116	5116	311	100.00	4.00	4.00	2.56	0.59	1.83	17.67	17.67	117	0.15	1.29
118	119	3	3	5138	5138	392	21.88	2.00	2.05	2.13	0.91	3.57	19.41	19.41	118	2.15	3.28
119	128	0	131	5084	5102	760	101.88	4.00	4.00	2.60	0.61	4.62	15.84	33.84	119	0.36	1.14

				150											Pipe Type:		PVC SCH 40
PIPE SEGMENT NUMBER	FLOWS INTO SEGMENT	NUMBER OF (EDU's)	ACCUM EDU's CONNECTED	LOW DATUM in Segment	CONTROL DATUM of Segment	PIPE LENGTH (FEET)	MAX FLOW (GAL/MIN)	PIPE SIZE (INCH)	PIPE ID (INCHES)	MAX VELOCITY (FT/SEC)	FRICTION FACTOR (FT/C.FT)	FR LOSS THIS PIPE (FEET)	ACCUM FL (FEET)	MAX HEAD REQUIRED (FEET)	PIPE SEGMENT NUMBER	SEGMENT RETENTION TIME	HOURS TO DISCHARGE
120	121	3	3	5052	5102	390	21.88	2.00	2.05	2.13	0.91	3.55	24.50	74.50	120	2.14	4.17
121	122	6	9	5068	5102	493	25.63	2.00	2.05	2.49	1.22	6.01	20.95	54.95	121	0.90	2.04
122	128	3	12	5080	5102	267	27.50	2.00	2.05	2.68	1.39	3.71	14.94	36.94	122	0.37	1.14
123	124	3	3	5106	5114	180	21.88	2.00	2.05	2.13	0.91	1.64	22.55	30.55	123	0.99	2.90
124	125	6	9	5104	5114	374	25.63	2.00	2.05	2.49	1.22	4.56	20.91	30.91	124	0.68	1.91
125	127	2	11	5100	5102	132	26.88	2.00	2.05	2.62	1.33	1.76	16.35	18.35	125	0.20	1.23
126	127	2	2	5092	5102	195	21.25	2.00	2.05	2.07	0.86	1.68	16.27	26.27	126	1.60	2.64
127	128	1	14	5090	5102	223	28.75	2.00	2.05	2.80	1.51	3.37	14.59	26.59	127	0.26	1.03
128	129	0	157	5084	5102	319	118.13	4.00	4.00	3.02	0.80	2.55	11.22	29.22	128	0.13	0.77
129	139	0	369	5084	5102	402	250.63	6.00	6.03	2.81	0.44	1.75	8.67	26.67	129	0.16	0.65
130	124	2	2	5190	5190	1245	21.25	2.00	2.05	2.07	0.86	10.74	31.65	31.65	130	10.23	12.15
131	132	3	3	5160	5188	76	21.88	2.00	2.05	2.13	0.91	0.69	67.76	95.76	131	0.42	4.03
132	133	6	9	5182	5188	511	25.63	2.00	2.05	2.49	1.22	6.23	67.07	73.07	132	0.93	3.61
133	134	8	17	5134	5172	768	30.63	2.00	2.05	2.98	1.70	13.04	60.83	98.83	133	0.74	2.68
134	137	0	19	5134	5134	625	31.88	2.00	2.05	3.10	1.83	11.42	47.80	47.80	134	0.54	1.94
135	136	3	3	5150	5184	243	21.88	2.00	2.05	2.13	0.91	2.21	42.51	76.51	135	1.33	3.74
136	137	3	6	5138	5168	370	23.75	2.00	2.05	2.31	1.06	3.92	40.30	70.30	136	1.01	2.41
137	138	5	30	5100	5130	769	38.75	2.00	2.05	3.77	2.62	20.18	36.37	66.37	137	0.42	1.39
138	139	5	35	5084	5102	723	41.88	2.50	2.44	2.86	1.28	9.27	16.19	34.19	138	0.48	0.97
139	0	0	401	5086	5105	1379	270.63	6.00	6.03	3.04	0.50	6.92	6.92	25.92	139	0.49	0.49

Compare Our Features

Barnes	Environment/One
200' TDH Constant Duty	92' TDH Constant Duty
200' TDH Constant Duty	138'TDH Intermittent Duty
Flows To 30 gpm	Flows To 15 gpm
Vortex bronze	Cast Rotor
One Piece Fiberglass Tank OR Polyethylene / polystyrene combination (NO Welded Seams)	Polyethylene Tank (W/"Welded" Seams)
Tank Custom Made For Project AND can be field adjusted with no additional costs (ECOTRAN)	Tanks Over 96" Require A "Field Joint"
True Submersible Pump	Must Have Breather—Cannot Be Submerged
Angled Blades On Cutter (Like Scissors)	Straight Blades
Hardened Shredding Ring & Stationary	Only Stationary Hardened
Reversible Stationary For Double Life	Not Reversible
Motor Delivers 30.6 Ft Lbs Starting Torque	Motor Delivers 8.4 Ft Lbs Starting Torque
Run Dry Protection Not Required	No Run Dry Protection
Closed Valve Protection Optional	No Closed Valve Protection
Three (3) Separate Switches Used For Level Control OR Sealed Diaphragm Switch Requiring No Maintenance (Unaffected by Grease)	Two (2) Switches (Combined On/Off) Used For Level Control

BARNES PRESSURE SYSTEMS

www.cranepumps.com

House Pumps

Model OGP

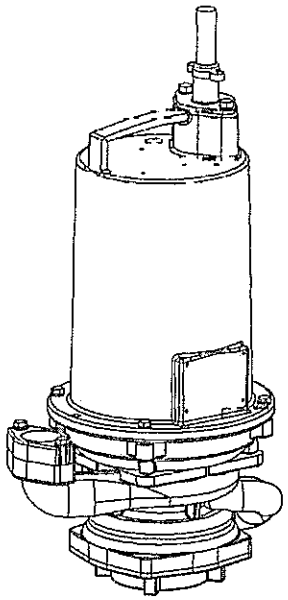
Recessed Vortex

PS-091

Submersible Grinder Pumps

Specifications:

DISCHARGE		1¼" NPT, Vertical, Bolt-on Flange
LIQUID TEMPERATURE		104°F (40°C) Continuous
VOLUTE		Cast Iron ASTM A-48, Class 30
MOTOR HOUSING		Cast Iron ASTM A-48, Class 30
SEAL PLATE		Cast Iron ASTM A-48, Class 30
IMPELLERS:	*Design*	12 Vane,Vortex, With Pump Out Vanes On Back Side. Dynamically Balanced, ISO G6.3.
	Material	85-5-5-5 Bronze
IMPELLER SPACER		300 Series Stainless Steel
SHREDDING RING		Hardened 440C Stainless Steel Rockwell® C-55.
CUTTER		Hardened 440CStainless Steel, Rockwell® C-55.
SHAFT		416 Stainless Steel
SQUARE RINGS		Buna-N
HARDWARE		300 Series Stainless Steel
PAINT		Air Dry Enamel.
SEAL:	*Design*	Single Mechanical
	Material	Rotating Faces - Silicon-Carbide Stationary Faces - Silicon-Carbide Elastomer - Buna-N Hardware -300 Series Stainless
CORD ENTRY		15 ft. (4.5m) Std. Cord. Custom Molded Quick Connect, for Sealing and Strain Relief
CORD	*Manual*	CSA/UL Approved 12/3 Type SOW
UPPER BEARING:		
	Design	Single Row, Angular contact Ball
	Lubrication	Oil
	Load	Radial & Thrust
LOWER BEARING:		
	Design	Single Row, Angular contact Ball
	Lubrication	Oil
	Load	Radial & Thrust
MOTOR:	*Design*	NEMA L-Single Phase Torque Curve, Oil-Filled, Squirrel Cage Induction
	Insulation	Class F
SINGLE PHASE		Capacitor Start/Capacitor Run.
OPTIONAL EQUIPMENT		Cord Length, Moveable Fitting



Series: OGP
2HP, 3450RPM, 60Hz

Submersible Wastewater Pump Association SWPA MEMBER

omni GRIND plus GRINDER PUMPS

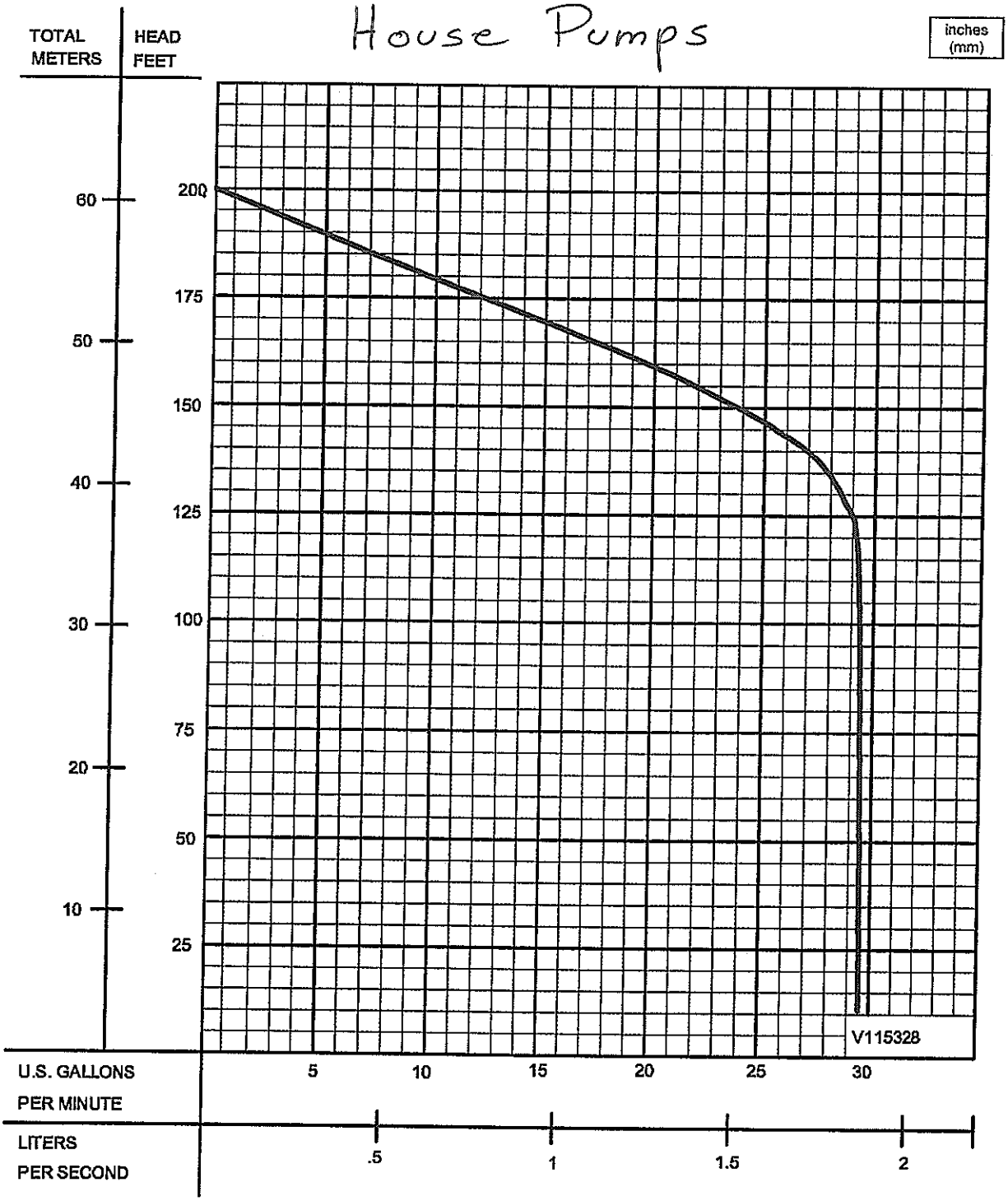
UL CSA

CSA 108 - File No. LR16567
UL 778

DESCRIPTION:

THE GRINDER PUMP IS DESIGNED TO REDUCE DOMESTIC SEWAGE TO A FINELY GROUND SLURRY.

House Pumps



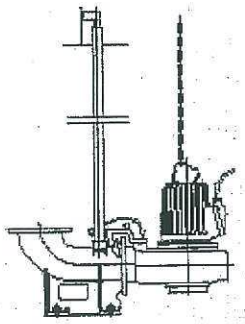
Testing is performed with water, specific gravity 1.0 @ 68° F @ (20°C), other fluids may vary performance

A2) Phase 5 LPS Lift Station Specifications

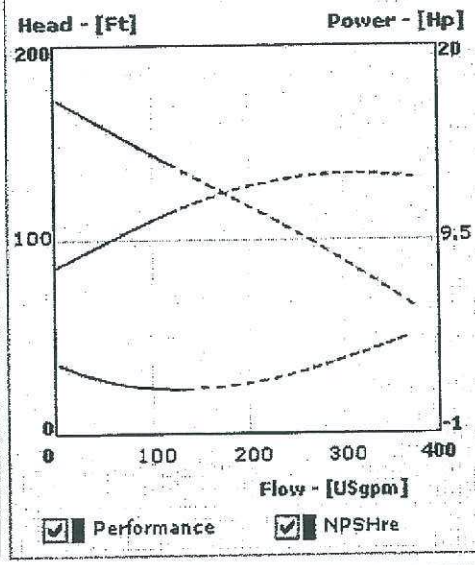
Phase 5 Pumps

PRODUCT: CP 3127 SH

Product picture



Curves ⊕ **Enlarge**



Pump Data

Curve id: 63-259-00-5207 | Impeller: 259 | Poles: 2 - pole | Motor: 21-11-2AL | Frequency: 60 Hz

Motor Data

Rated output power Hp (kW)	Ø	Nominal voltage (V)	Full load current (A)	Locked rotor current (A)	Locked rotor kVA	Locked rotor code letter kVA/Hp	Poles/rpm
11 (8.2)	3	230	26	192	76	H	2/3495
11 (8.2)	3	460	13	96	76	H	2/3495

Pump motor Hp	Efficiency			Power factor		
	100% load	75% load	50% load	100% load	75% load	50% load
11	83.5	84	82.5	0.93	0.92	0.88

Cable Data

HP	Cables	Volts	Max. length (Ft)	Cable size/Nominal OD.	Conductors (In one cable)	Type	Part number
11	1	230	195	#8/3-2-1-GC 1.11"-(28.2mm)	(3) 8 AWG (PWR) (2) 10 AWG (CTRL) (1) 8 AWG (GND) (1) 10 AWG (GC)	STD	942108
11	1	460	200	#14/7 0.75"-(19.0mm)	(3) 14 AWG (PWR) (2) 14 AWG (CTRL) (1) 14 AWG (GND) (1) 14 AWG (GC)	STD	942102

Available Discharge Connection Outlet Size

Outlet Drilled Flange	3"

Phase 5 Pumps

PERFORMANCE CURVE

PRODUCT	C 3127.181
TYPE	SH
DATE	2006-11-30
PROJECT	FLYGT US Catalog
CURVE NO	63-259-00-5207
ISSUE	1

	1/1-LOAD	3/4-LOAD	1/2-LOAD
POWER FACTOR	0.93	0.92	0.88
EFFICIENCY	83.5 %	84.0 %	82.5 %
MOTOR DATA	---	---	---

RATED POWER	11	hp
STARTING CURRENT ...	96	A
RATED CURRENT ...	13	A
RATED SPEED	3495	rpm
TOT.MOM.OF INERTIA ...	0.040	kgm2
NO. OF BLADES	1	

IMPELLER DIAMETER: 162 mm

MOTOR #	STATOR	REV
21-11-2AL	12YSER	11

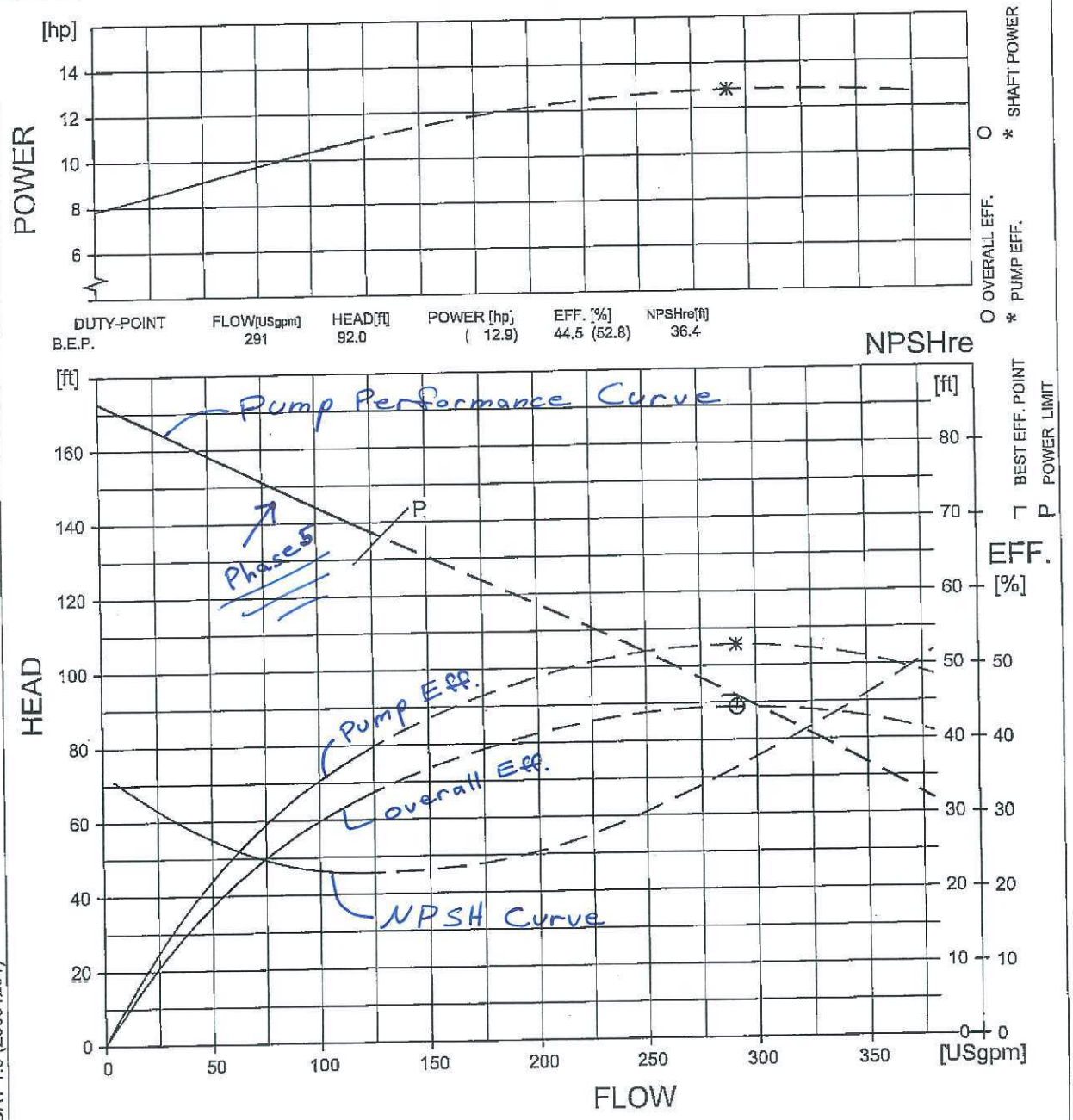
FREQ.	PHASES	VOLTAGE	POLES
60 Hz	3	460 V	2

GEARTYPE: --- RATIO: ---

COMMENTS: NEMA Code Letter: H; Installs: CP/CS

INLET/OUTLET: - / 3.0 inch

IMP. THROUGHLET: 1.6 inch



DUTY-POINT	FLOW[USgpm]	HEAD[ft]	POWER [hp]	EFF. [%]	NPSHre[ft]
B.E.P.	291	92.0	(12.9)	44.5 (52.8)	36.4

NPSHre = NPSH3% + min. operational margin

Performance with clear water and ambient temp 40 °C

FLYGT CURVE

FUSCAT 1.0 (20031201)

Phase 5 Pumps

C-3127

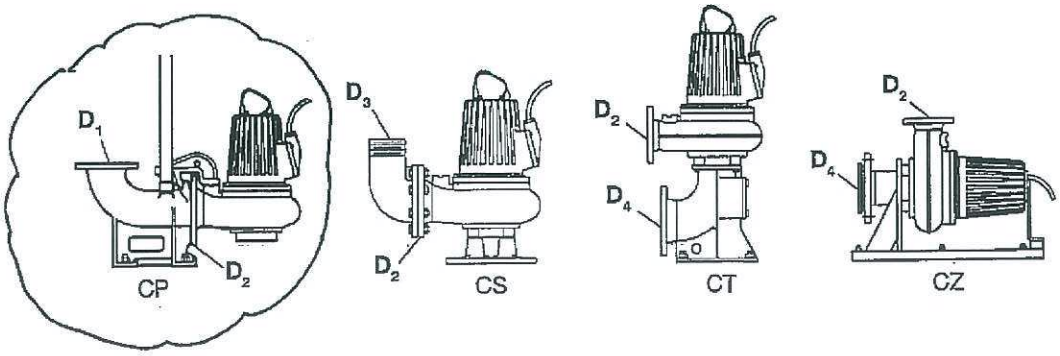
Impeller/Motor/Nominal Sizes

Issued: 11/06 | Supersedes: 11/05

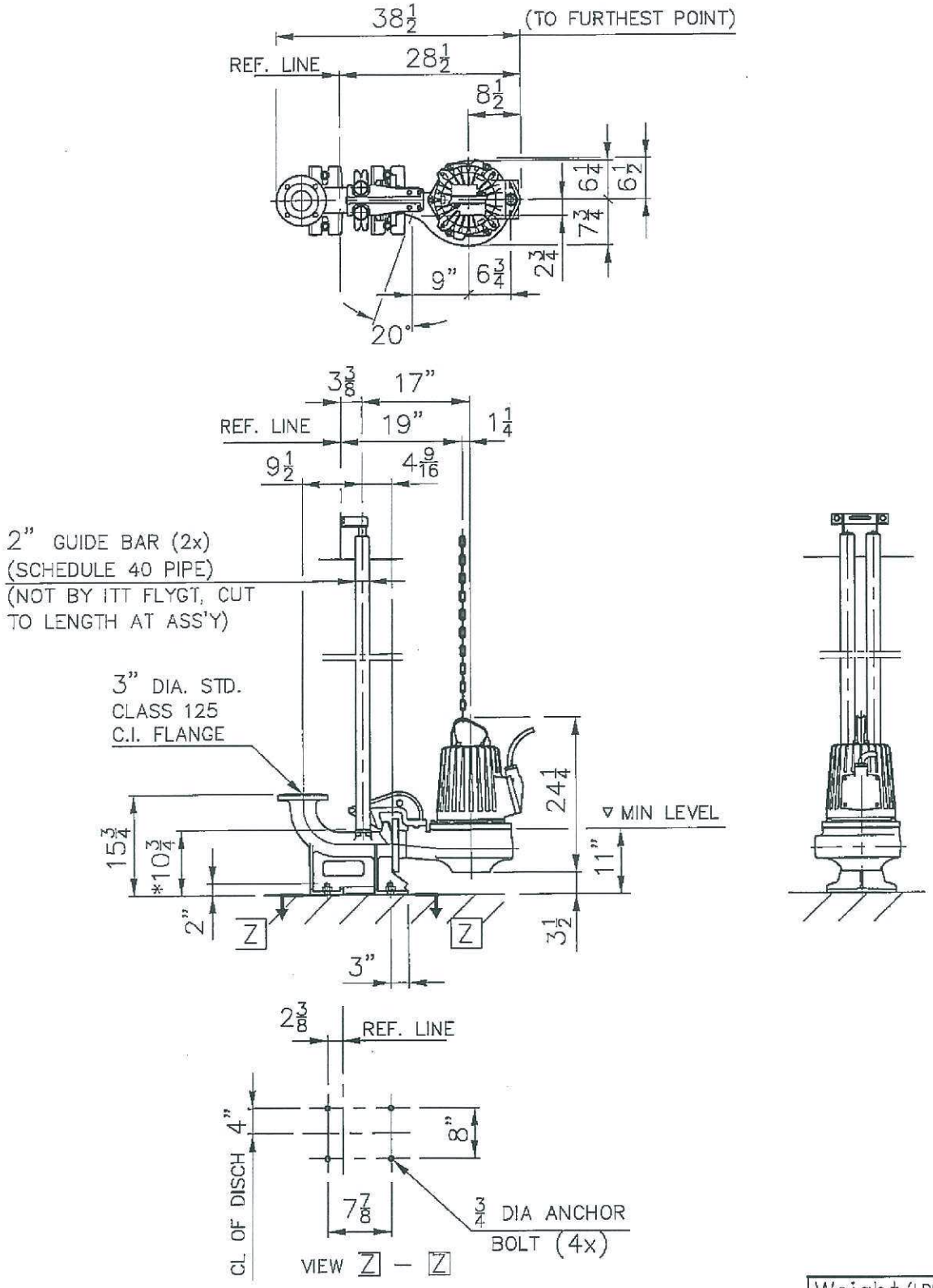
PUMP MODEL	IMPELLER CODE	HP RATING CP	HP RATING CS	HP RATING CT	HP RATING CZ	VAC	D1	D2	D3	D4
3127 3Ø	411 LT	10.0	10.0	--	--	200 230/460 575	6,8"	6"	6"	--
	412 LT	7.5	7.5	7.4	7.4		6,8"	6"	8"	8"
	432 MT	10.0	10.0	--	--					--
	433 MT	7.5,10	7.5,10	6.4,7.4	6.4,7.4		4"	4"	4"	
	434 MT	7.5,10	7.5,10	6.4,7.4	6.4,7.4		6"	6"	6"	6"
	436 MT	7.5,10	7.5,10	6.4,7.4	6.4,7.4		8"			
	442 LT	10.0	10.0	--	--		6,8"	6"	6,8"	--
	481 HT	10.0	10.0	--	--					
	483 HT	10.0	10.0	--	--		4"	4"	4"	--
	484 HT	10.0	10.0	--	--					
	485 HT	7.5,10	7.5,10	7.4	7.4					4"
	257 SH 258 SH 259 SH	11.0	11.0	--	--		3"	3"	3"	--

PUMP MODEL	IMPELLER CODE	HP RATING CP	HP RATING CS	VAC	D1	D2	D3	D4
3127 1Ø	412 LT	7.5	7.5	230	6,8"	6"	6,8"	--
	433 MT 434 MT	7.5	7.5		4" 6" 8"	4" 6"	4" 6"	--
	462 HT 463 HT 484 HT 485 HT	7.5	7.5		4"	4"	4"	--

LT= High Volume MT= Standard HT= High Head



Phase 5 Pumps

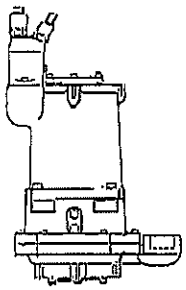


ALL DIMENSIONS IN INCHES
* DIMENSION TO ENDS OF GUIDE BARS

Weight (LBS)	
Pump	Disch
325	80

ITT FLYGT AUTOCAD DRAWING	Denomination: Dimensional drwg CP 3127 SH,HT 3"/ 3"	Drawn by KJas / Checked by EGC / Date 880126	
		Scale	Req no 5399
		538 91 00	C

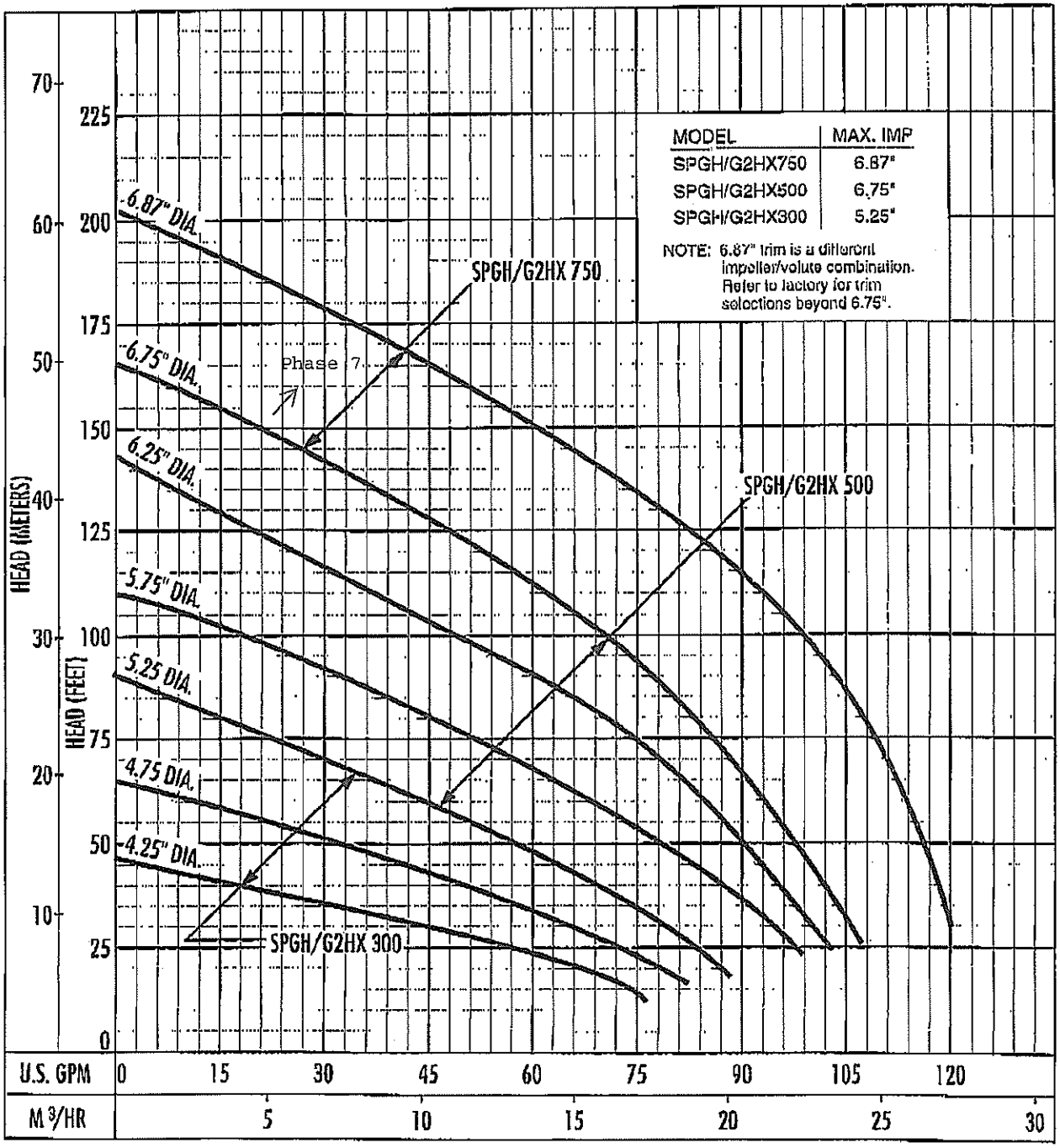
A3) Phase 7 LPS Lift Station Specifications



Phase 7 Pumps

Performance Curve — SPGH/G2HX

RPM: 3500 Discharge: 2"



Operating point must fall within curve.

AURORA PUMP
A UNIT OF GENERAL SIGNAL

Conditions of Service:
GPM: _____ TDH: _____

HYDROMATIC™ PUMPS

Phase 7 Pumps

HYDROMATIC PUMPS
A Marley Pump Company

Bulletin SPG-503

Electrical Data

MODEL: SPGH; 60Hz

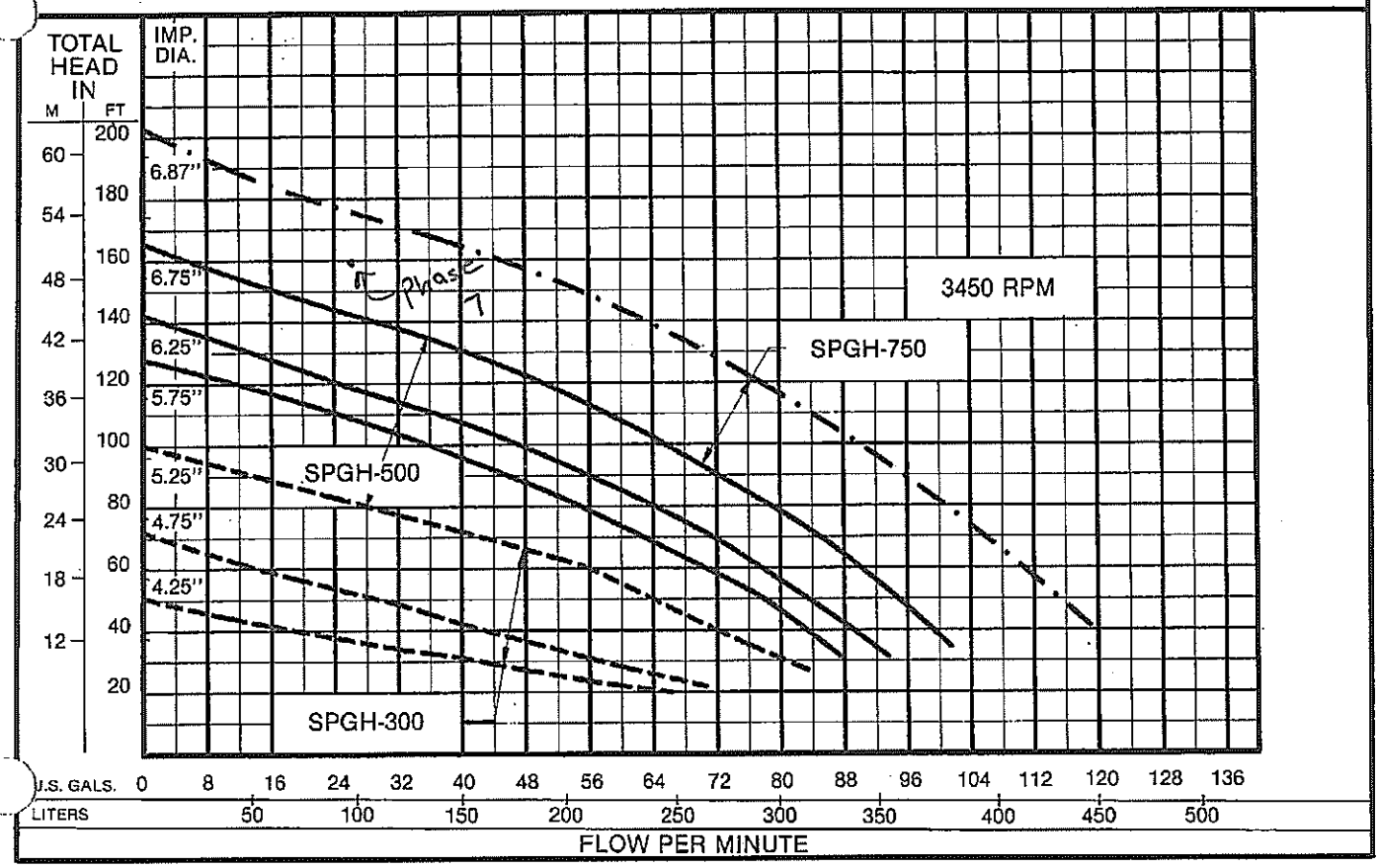
MOTOR ELECTRICAL DATA										
HP	PHASE	RPM	VOLTS	START AMPS	RUN AMPS	RUN KW	START KVA	RUN KVA	NEC CODE LETTER	SERVICE FACTOR
3	1	3450	200	81	20.7	3.8	16.2	4.1	F	1.2
3	1	3450	230	70.5	18	3.8	16.2	4.1	F	1.2
3	3	3450	200	53	10.9	3.3	18.4	3.8	G	1.2
3	3	3450	230	46	9.5	3.3	18.4	3.8	G	1.2
3	3	3450	460	23	4.7	3.3	18.4	3.8	G	1.2
5	1	3450	230	125	28.5	6.1	28.8	6.6	F	1.2
5	3	3450	200	82.8	17.8	5.4	28.7	6.2	G	1.2
5	3	3450	230	72	15.5	5.4	28.7	6.2	G	1.2
5	3	3450	460	36	7.8	5.4	28.7	6.2	G	1.2
7.5	3	3450	230	130	21.6	7.6	51.8	8.6	G	1.2
7.5	3	3450	460	65	10.8	7.6	51.8	8.6	G	1.2

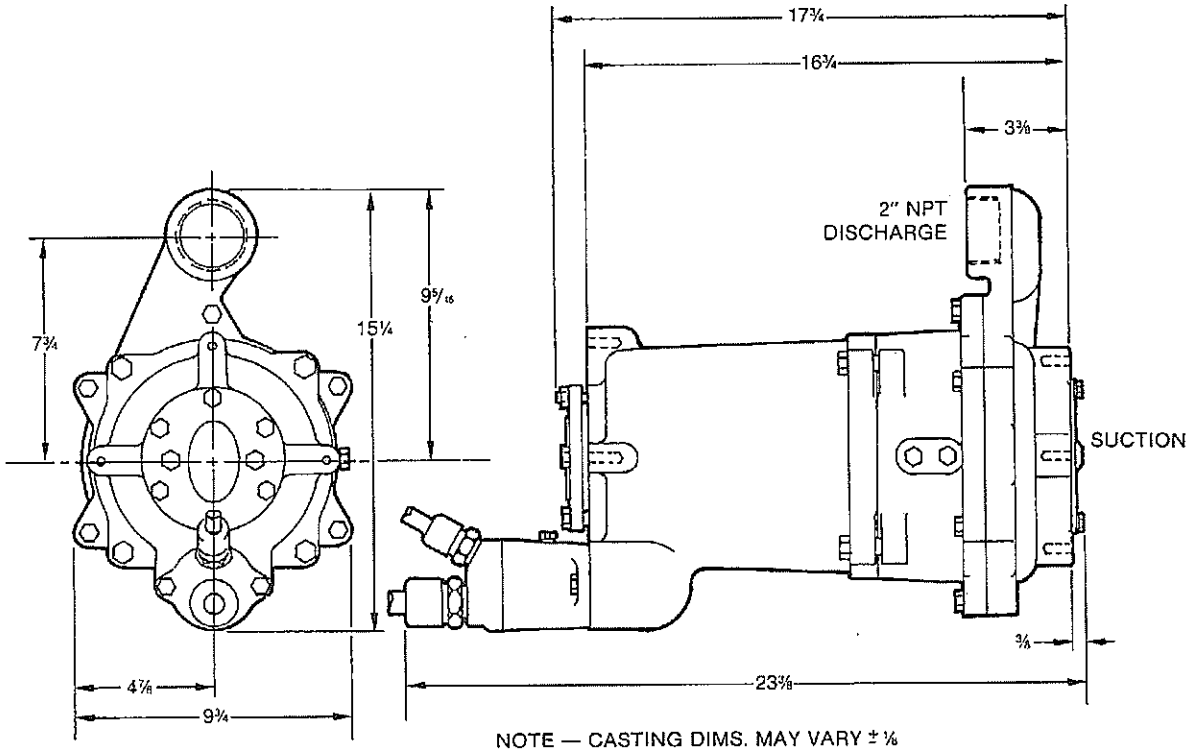
MOTOR EFFICIENCIES AND POWER FACTOR								
			MOTOR EFFICIENCY			POWER FACTOR		
HP	PHASE	RPM	100% LOAD	75% LOAD	50% LOAD	100% LOAD	75% LOAD	50% LOAD
3	1	3450	.58	.57	.51	.93	.92	.87
3	3	3450	.70	.67	.62	.85	.82	.75
5	1	3450	.68	.67	.64	.92	.92	.92
5	3	3450	.69	.68	.63	.86	.86	.84
7.5	3	3450	.75	.74	.72	.88	.85	.82

Run Amperes, Run KW and Run KVA are based on 100% load; values will be higher when operated on service factor.

Phase 7 Pumps

MODELS: SPGH-300, SPGH-500 & SPGH750 SUBMERSIBLE HYDR-O-GRIND 3HP, 5HP & 7½ HP SEWAGE PUMP 3450 RPM





NOTE — CASTING DIMS. MAY VARY ± ⅛

A4) Odor Control System Specifications

Bioscience, Inc.
Environmental Products and Services

Contact representative for more information

MICROCAT® Products - Odor Control

About Us
Products
Services
Information
Equipment
Contact Us

MICROCAT®-ANL Odor Control Bioformula	Phototropic (light activated) microbes, in liquid form, for control of sulfur-based odor-causing compounds. Also degrades organics under anaerobic conditions.
MICROCAT®-DL Deodorizer/Liquefier Bioformula	Specialized microbes and enzymes for deodorizing/liquefication of animal wastes.
MICROCAT®-EC Natural Protein/Food Grade Cleaner/Deodorizer	Cleans and deodorizes hospital drains/traps in liquid form.
MICROCAT®-ECL Natural Protein/Food Grade Cleaner/Deodorizer	Selected natural enzymes, proteins and surfactants (no bacteria) in liquid form for cleaning and deodorizing applications.
MICROCAT®-TN Bioformula for Hydrogen Sulfide Control	Preselected, adapted microorganisms for aerobic biodegradation of hydrogen sulfide. Also contains additional synergistic ingredients for nutrition of the microbes.
MICROCAT®-UXL Natural Cleaner/Deodorizer	Urine and related odor control liquid.

ISO 9001:2000 Certified

Bioscience, Inc
Environmental Products and Services

MICROCAT®-ANL

ODOR CONTROL BIOFORMULA FOR SLUDGE, COMPOST AND WASTEWATER

■ DESCRIPTION:

MICROCAT-ANL is a liquid blend of preselected, adapted microorganisms for use under microaerophilic, anoxic or anaerobic conditions. It is formulated for use in sludge, compost, contaminated soils and wastewaters to suppress hydrogen sulfide odors and enhance biodegradation and contaminant removal where oxygen is of limited availability.

■ APPLICATIONS:

ODOR CONTROL

Anaerobic microbial metabolism frequently results in odors caused by sulfur-bearing compounds. Such odors arise in sludge handling, composting and in wastewater treatment. **MICROCAT-ANL** can help. Its specialized microbes reduce sulfides under anaerobic or anoxic conditions to elemental sulfur, which is occluded by the cells thus suppressing odors. **MICROCAT-ANL** is particularly well suited to applications in sewer lines, primary treatment systems, sludge processing and handling systems, and anaerobic or facultative lagoons. Such systems are commonly found in dairy, meatpacking, food processing and municipal sewage transport and waste treatment.

BIODEGRADATION

The release of waste materials into the environment creates odor and contamination problems. While biological remediation of contamination typically involves aerobic biodegradation, in many cases aeration is non-existent or difficult to achieve. **MICROCAT-ANL** supplies an inoculum of preselected organisms for improving biodegradation under such conditions. The conveyance of wastewaters in sewer lines and subsequent treatment in primary treatment operations or anaerobic lagoons is frequently accompanied by separation or deposition of insoluble solids, especially oil and grease. These problems are reduced or overcome by the regular use of **MICROCAT-ANL**.

PRODUCT CHARACTERISTICS:

Appearance	Reddish brown, translucent, non-viscous liquid
Contents	Specialized, preselected, phototrophic, facultative anaerobes
Shelf Life	Six Months
Packaging	Five / Fifty-five gallon (18.9 / 208.2 L) shielded plastic drums

APPLICATION PROGRAMS:

In general, **MICROCAT-ANL** is applied (or metered) to the soil, sewer line, primary treatment unit or anaerobic lagoon on a preventive maintenance basis. For wastewaters, preventive maintenance application rates range from about 1 gallon (3.785 liter) per MGD (3785 m^3/day) per day to 30 gallons (11.36 liter) per MGD (3785 m^3/day) per day, depending on the waste type and conditions of treatment. Your Bioscience, Inc. Technical Representative will provide you with a custom-tailored application program to fit your specific needs.

OPTIMAL APPLICATION CONDITIONS

For best results, apply this product under the following conditions:

CONDITION	RANGE	OPTIMUM
Dissolved Oxygen, ppm	0 – 0.5	0.5
pH	6 - 9	7
Temperature, ^{0} C	10 - 40	35
Toxic Heavy Metals, ppm	Trace	None

If your system is operating outside these ranges, contact your Bioscience, Inc. Technical Representative for a complete system survey and recommendations.

STORAGE AND HANDLING

Storage	55° - 120° F (13° - 49° C). Store indoors at room temperature. DO NOT FREEZE. DO NOT STORE IN DIRECT SUNLIGHT.
Handling	**CAUTION** If accidental skin contact occurs wash affected area with soap and water. Do not ingest. Non-toxic, non-pathogenic, harmless to aquatic life.

ANL-041012

1550 Valley Center

MICROCAT® is a registered trademark of Bioscience, Inc.

Parkway, Suite 140 • Bethlehem, PA 18017 • (610) 974-9693 •Fax (610) 691-2170
E-mail: bioscience@bioscienceinc.com • Website: www.bioscienceinc.com

MATERIAL SAFETY DATA SHEET

SECTION I - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Manufacturer:
Bioscience Inc.
1550 Valley Center Parkway, Suite 140
Bethlehem, PA 18017

Creation Date: 3/99
Review Date: 3/05

Information Phone Number: 800-627-3069
Emergency Phone Number: 800 424-9300

Commercial Product Name: **MICROCAT®-ANL Odor Control Bioformula for Sludge, Compost, Soil and Wastewater**
Chemical Characterization: Microbial suspension in aqueous medium.

SECTION II - COMPOSITION AND INFORMATION ON INGREDIENTS

Hazardous Ingredients:	CAS Number:	TLV (ACGIH):	PEL (OSHA):
None	None assigned	None established	None established

Appearance: Colorless to Light Gray, Turbid Form: Liquid Odor: Slight sulfide odor

SECTION III - HAZARD IDENTIFICATION AND FIRST AID PROCEDURES

INHALATION: May aggravate asthma, bronchial or lung diseases. If inhaled, remove from contaminated area to fresh air. Report situation. Seek medical attention if allergic response exhibited.

EYE CONTACT: Product is not known to cause eye irritation. However, it is recommended that direct contact with eyes be avoided. In case of contact with eyes, flush eyes with low pressure water for at least 15 minutes. If irritation persists, seek medical attention.

SKIN CONTACT: May lead to opportunistic infection of broken skin. In case of contact with skin, wash skin with soap and water. Remove contaminated clothing and wash. If irritation persists seek medical attention.

SWALLOWING: Ingestion of material may cause gastric disturbance. If swallowed, rinse mouth and throat with tap water. Seek medical attention.

SECTION IV - FIRE FIGHTING MEASURES

Flash Point: >200°F Flammable Limits: Not Applicable
Extinguishing Media: Material is non-flammable. All common fire fighting materials may be used with this product and/or packaging.

SECTION V - ACCIDENTAL RELEASE MEASURES

AFTER SPILLAGE: Use absorbent material to collect and contain for disposal. Contain large spills and pump to suitable tank for reuse. Wash down with detergent and thoroughly rinse.

FIRST AID: In case of contact with skin, wash with soap and water. If symptoms occur, seek medical attention. In case of contact with eyes, rinse with plenty of water for at least 15 minutes and see an eye specialist if irritation persists. In case of inhalation, remove to fresh air. In case of allergic response including shortness of breath or difficulty breathing, seek medical assistance. In case of ingestion, drink water. If symptoms occur, seek medical assistance.

SECTION VI - PERSONAL PROTECTION/HANDLING AND STORAGE

TECHNICAL PROTECTIVE MEASURES:

Chemical workers goggles and vinyl or rubber gloves recommended. Eye wash and safety shower in work area.

RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT:

RESPIRATORY PROTECTION: Canister (H_2S absorbent) or supplied air respirator recommended for extended work with large volume. Provide adequate ventilation

SKIN PROTECTION: Long-sleeve shirt, trousers, safety shoes, rubber gloves, and coveralls recommended.

EYE PROTECTION: Safety goggles recommended.

INDUSTRIAL HYGIENE: Maintain good housekeeping. Wash hands and exposed skin after contact. Avoid contact with food or food preparation surfaces. If exposure of food surfaces occurs, wash with germicidal detergent or chlorine bleach. Remove and wash contaminated clothing.

PROTECTION AGAINST FIRE AND EXPLOSIONS: No special requirements.

SECTION VII - PHYSICAL PROPERTIES

Solubility in Water: Soluble w/ <1% Suspended Matter | Alternative Solvent: N/A | pH Range: 6-8
Specific gravity (25°C): 1.004 | Vapor Pressure and Evaporation Rate: approximately equal to water | Boiling Point (°C): 100 +/-2

SECTION VIII – TOXICOLOGICAL INFORMATION

Ingestion of large quantities may cause gastric distress. May lead to opportunistic infection of broken skin. May induce allergic response for susceptible individuals.

Carcinogenicity: NTP: No | IARC Monographs: No | OSHA Regulated: No

SECTION IX – INFORMATION ON ECOLOGICAL EFFECTS

Product is readily biodegradable

SECTION X - DISPOSAL CONSIDERATIONS

Disposal: Dispose of in accordance with current local authority regulations. Disposal to local wastewater treatment plant or, for absorbent contained material, to sanitary landfill.

SECTION XI - TRANSPORT CLASSIFICATION

DOT Hazard Class: N/A | DOT Label: N/A
DOT Proper Shipping Name: Chemicals not other wise indexed (NOI) non-hazardous

SECTION XII - REGULATORY INFORMATION

SECTION XIII - FURTHER INFORMATION

The information contained in this Safety Data Sheet, as of the issue date, is believed to be true and correct. However, the accuracy or completeness of this information and any recommendations or suggestions are made without warranty or guarantee. Since the conditions of use are beyond the control of our company, it is the responsibility of the user to determine the conditions of safe use of this product. The information in this sheet does not represent analytical specifications; for this information contact Bioscience, Inc. Technical Department.

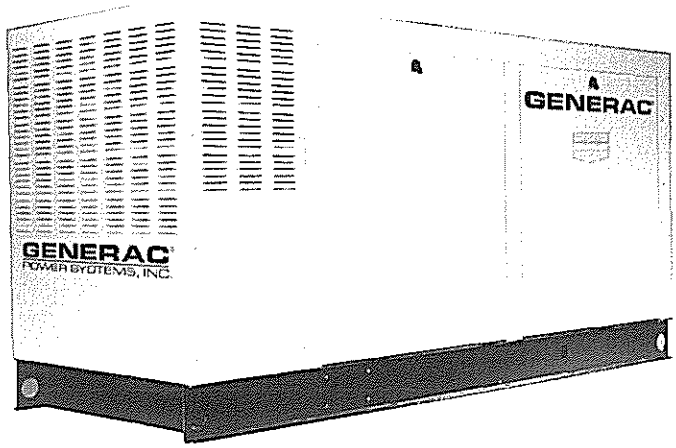
A5) Propane Generator Specifications

QT070

Liquid Cooled Gas Engine Generator Sets

Standby Power Rating

70 kW 60 Hz



GENERAC 6.8L ENGINE
Naturally Aspirated
Gaseous Fueled

STANDARD EQUIPMENT

- All input connections in one single area
- High coolant temperature shutdown
- Low oil pressure shutdown
- Low coolant level automatic shutdown
- Low fuel pressure
- Overspeed automatic shutdown
- Adjustable cranking timer
- Adjustable exercise timer
- Oil drain extension
- Cool flow radiator
- Closed coolant recovery system
- UV/Ozone resistant hoses
- Watertight state of the art electrical connectors
- Mainline circuit breaker
- Oil drain extension to frame rail
- Radiator drain extension
- Battery charge alternator
- 2 Amp static battery charger
- Battery and battery cables
- Battery rack
- Fan and belt guards
- Isochronous governor

FEATURES

- Innovative design and fully prototype tested
- UL2200 Listed
- Solid state frequency compensated digital voltage regulator
- Dynamic and static battery charger
- Sound attenuated acoustically designed enclosure
- Quiet test for low noise level exercise
- Acoustically designed engine cooling system
- High flow low noise factory engineered exhaust system
- State of the art digital control system with H-100 microprocessor control panel
- Built-in kW, kVAR and power factor meters
- Watertight electrical connectors
- Rodent proof construction
- High efficiency, low distortion Generac designed alternator
- Vibration isolated from mounting base
- Matching Generac transfer switches engineered and tested to work as a system
- All components easily accessible for maintenance
- Electrostatically applied powder paint

GENERAC®
POWER SYSTEMS, INC.

APPLICATION & ENGINEERING DATA

QT070

GENERATOR SPECIFICATIONS

TYPE	Synchronous
ROTOR INSULATION	Class H
STATOR INSULATION	Class H
TOTAL HARMONIC DISTORTION	<3.5%
TELEPHONE INTERFERENCE FACTOR (TIF)	<50
ALTERNATOR OUTPUT LEADS 3 PHASE	4 wire
BEARINGS	Sealed Ball
COUPLING	Flexible Disc
LOAD CAPACITY (STANDBY RATING)	70 kW
EXCITATION SYSTEM	Brushless

NOTE: Generator rating and performance in accordance with ISO8528-5, BS5514, SAE J1349, ISO3046, and DIN6271 standards.

VOLTAGE REGULATOR

TYPE	Full Digital
SENSING	3 Phase
REGULATION	± 1/4%
FEATURES	Built into H-100 Control Panel V/F Adjustable Adjustable Voltage and Gain

GENERATOR FEATURES

- ☐ Revolving field heavy duty generator
- ☐ Directly connected to the engine
- ☐ Operating temperature rise 120 °C above a 40 °C ambient
- ☐ Insulation is Class H rated at 150 °C rise
- ☐ All prototype models have passed three phase short circuit testing

CONTROL PANEL FEATURES

☐ TWO FOUR LINE LCD DISPLAYS READ:

- Voltage (all phases)
- Power factor
- kVAR
- Engine speed
- Run hours
- Fault history
- Coolant temperature
- Low oil pressure shutdown
- Overvoltage
- Low coolant level
- Not in auto position (flashing light)
- ATS selection
- Current (all phases)
- kW
- Transfer switch status
- Low fuel pressure
- Service reminders
- Oil pressure
- Time and date
- High coolant temperature shutdown
- Overspeed
- Low coolant level
- Exercise speed

☐ INTERNAL FUNCTIONS:

- I^2T function for alternator protection from line to neutral and line to line short circuits
- Emergency stop
- Programmable auto crank function
- 2 wire start for any transfer switch
- Communicates with the Generac HTS transfer switch
- Built-in 7 day exerciser
- Adjustable engine speed at exerciser
- RS232 port for GenLink® control
- RS485 port remote communication
- Canbus addressable
- Governor controller and voltage regulator are built into the master control board
- Temperature range -40 °C to 70 °C

ENGINE SPECIFICATIONS

MAKE	Generac
MODEL	V Type
CYLINDERS	10
DISPLACEMENT	6.8 Liter
BORE	3.55
STROKE	4.17
COMPRESSION RATIO	9:1
INTAKE AIR SYSTEM	Naturally Aspirated
VALVE SEATS	Hardened
LIFTER TYPE	Hydraulic

GOVERNOR SPECIFICATIONS

TYPE	Electronic
FREQUENCY REGULATION	Isochronous
STEADY STATE REGULATION	± 0.25%

All functions are factory preset

Individual parameter adjustments can be made via GenLink®

ENGINE LUBRICATION SYSTEM

OIL PUMP	Gear
OIL FILTER	Full flow spin-on cartridge
CRANKCASE CAPACITY	5 Quarts

ENGINE COOLING SYSTEM

TYPE	Closed
WATER PUMP	Belt driven
FAN SPEED	2030
FAN DIAMETER	22 inches
FAN MODE	Pusher

FUEL SYSTEM

FUEL TYPE	Natural gas, propane vapor
CARBURETOR	Down Draft
SECONDARY FUEL REGULATOR	Standard
FUEL SHUT OFF SOLENOID	Standard
OPERATING FUEL PRESSURE	11" - 14" H_2O

ELECTRICAL SYSTEM

BATTERY CHARGE ALTERNATOR	12V 30 Amp
STATIC BATTERY CHARGER	12V 2 Amp
RECOMMENDED BATTERY	Group 24F, 525CCA
SYSTEM VOLTAGE	12 Volts

Rating definitions - Standby: Applicable for supplying emergency power for the duration of the utility power outage. No overload capability is available for this rating. (All ratings in accordance with BS5514, ISO3046 and DIN6271). (All ratings in accordance with BS5514, ISO3046, ISO8528 and DIN6271).

GENERAC®
POWER SYSTEMS, INC.

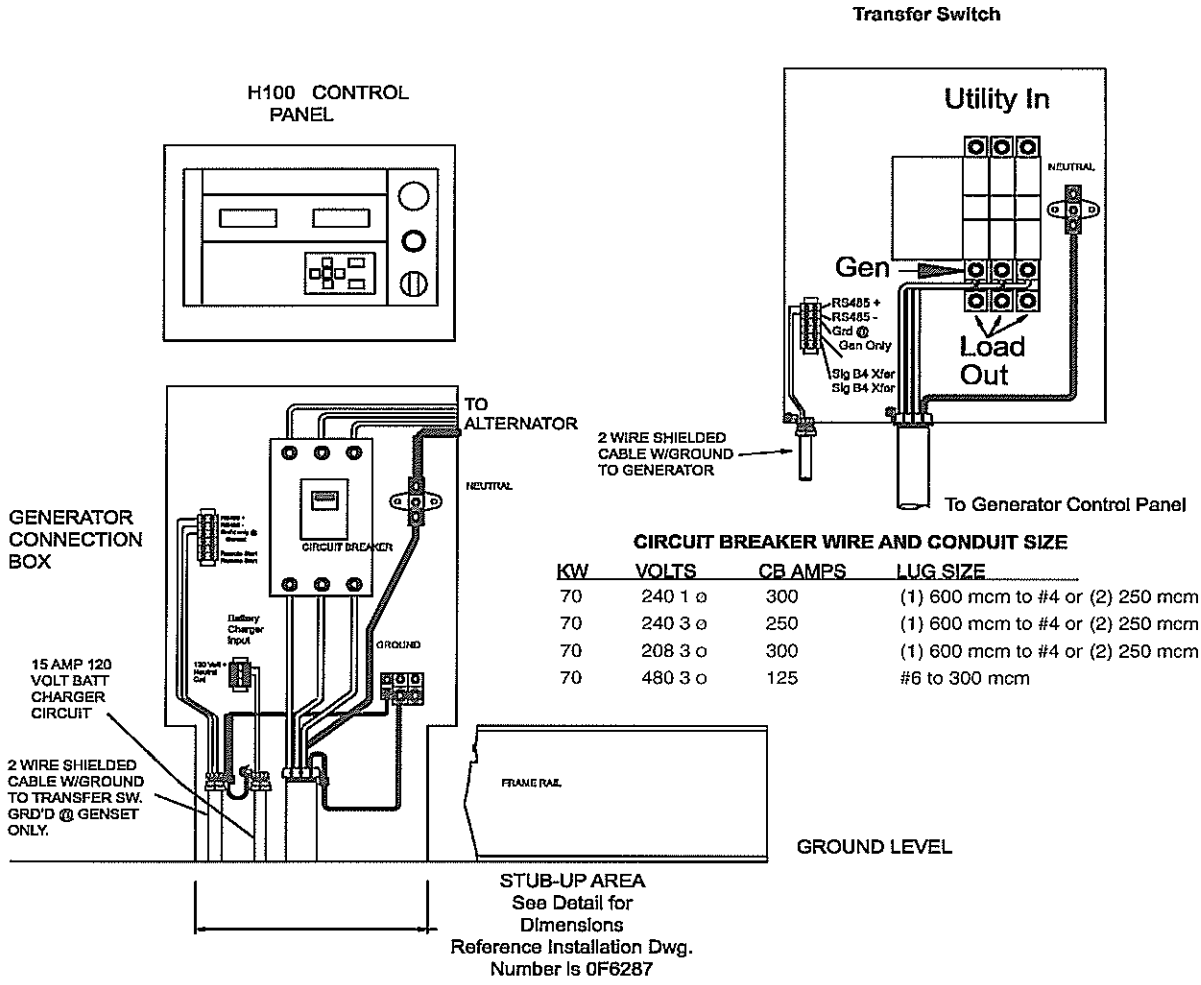
QT070

OPERATING DATA

	QT070		
KW RATING	70		
ENGINE SIZE	6.8 Liter V-10		
GENERATOR OUTPUT VOLTAGE/KW - 60 Hz	**KW**	**AMP**	**CB Size**
120/240V, 1-phase, 1.0 pf	70	292	300
120/240V, 3-phase, 0.8 pf	70	210	250
120/208V, 3-phase, 0.8 pf	70	243	300
277/480V, 3-phase, 0.8 pf	70	105	125
GENERATOR LOCKED ROTOR KVA AVAILABLE @ VOLTAGE DIP OF 35%			
Single phase or 208-240 3-phase		145	
480V 3-phase		160	
ENGINE FUEL CONSUMPTION (Natural Gas) (Propane)	**Natural Gas** (ft^3/hr.)	**Propane** (gal/hr.)	cu ft/hr
Exercise cycle	110	1.20	44.2
25% of rated load	260	2.85	104.9
50% of rated load	499	5.46	200.9
75% of rated load	696	7.62	280.4
100% of rated load	1020	11.17	411
ENGINE COOLING			
Air flow (inlet air including alternator and combustion air) ft^3/min.		5200	
System coolant capacity US gal.		4.5	
Heat rejection to coolant BTU/hr.		287,000	
Max. operating air temp. on radiator °C (°F)		60 (150)	
Max. ambient temperature °C (°F)		50 (140)	
COMBUSTION AIR REQUIREMENTS			
Flow at rated power 60 Hz cfm		205	
SOUND EMISSIONS IN DBA			
Exercising at 7 meters		61	
Normal operation at 7 meters		65	
EXHAUST			
Exhaust flow at rated output 60 Hz cfm		557	
Exhaust temp. at muffler outlet °F		890	
ENGINE PARAMETERS			
Rated synchronous RPM 60 Hz		1800	
HP at rated KW 60 Hz		110.7	
POWER ADJUSTMENT FOR AMBIENT CONDITIONS			
Temperature Deration			
3% for every 10 °C above - °C		25	
1.65% for every 10 °F above - °F		77	
Altitude Deration			
1% for every 100 m above - m		183	
3% for every 1000 ft. above - ft.		600	

RATING: All three phases units are rated at 0.8 power factor. All single phase units are rated at 1.0 power factor. STANDBY RATING: Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. There is no overload capability for this rating. Ratings are in accordance with ISO-3046-1. Design and specifications are subject to change without notice. kW rating is based on LPG fuel and may derate with natural gas.

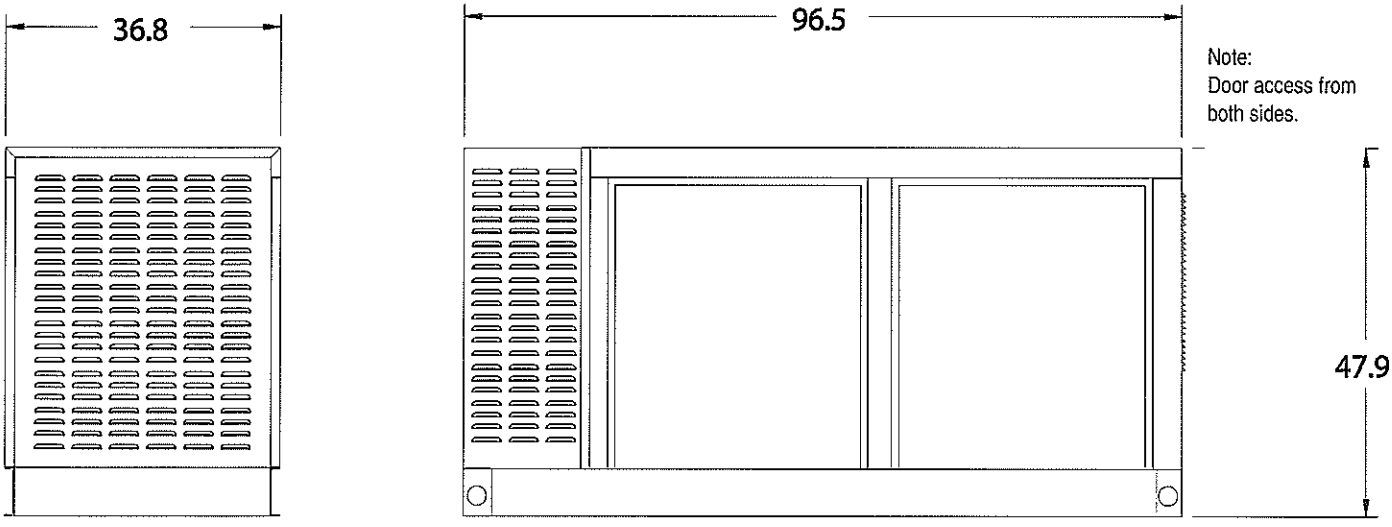
INTERCONNECTIONS



CIRCUIT BREAKER WIRE AND CONDUIT SIZE

KW	VOLTS	CB AMPS	LUG SIZE
70	240 1 ø	300	(1) 600 mcm to #4 or (2) 250 mcm to 1/0
70	240 3 ø	250	(1) 600 mcm to #4 or (2) 250 mcm to 1/0
70	208 3 o	300	(1) 600 mcm to #4 or (2) 250 mcm to 1/0
70	480 3 o	125	#6 to 300 mcm

INSTALLATION LAYOUT



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