Heisey Glass Formulas

The first formulas found are undated, but appear to be notes from a worker who was responsible for the glass batch formulas and given to Wilson Heisey, son of A. H., who acted as the company chemist before Emmet Olson was hired for this job.

Note that there are no coloring agents in these formulas. According to verbal history from Heisey employees, Wilson Heisey always added the coloring agents to the batch himself.

Lime Batch
Sand 1125
Soda Ash 390
Lime 118
Nitre 60
Cullet 1300

Lead Batch
Sand 416
Red lead 145
Potash 145
Soda ash 35
Lime 15
Nitre 20

Green Batch
Sand 1125
Soda ash 350
Lime 118
Potash 50
Nitre 65
Cullet 600

Rose Batch
Sand 800
Soda ash 300
Lime 100
Cullet 1200

Now Wilson you're wheel barrow weights 67 lbs. Take the lead batch you hafto make a half batch at a time so your sand would be 208 without wheel barrow 275 with so half of Soda ash would be 17½ lbs which would be 293 lbs half of lime would be 8 which would be 301 lbs on this wheel barrow half of nitre would be 10 lbs which would be 311

Lead Batch No. 2
Sand ..... 416 lbs
Soda ..... 32 lbs
Lime ..... 15 lbs
Potash ..... 122 lbs
Red lead ..... 122 lbs
Cullet 1200

Lime Batch
Sand ..... 1125 lbs
Soda ash ..... 390 lbs
Nitre ..... 60 lbs
Lime ..... 118 lbs
Cullet ..... 1350 lbs

Green Batch No. 1
Sand ..... 1125 lbs
Soda ash ..... 350 lbs
Potash ..... 50 lbs
Lime ..... 118 lbs
Nitre ..... 65 lbs
Cullet ..... 600 lbs

Lead Batch No. 1
Sand ..... 416 lbs
Soda ash ..... 35 lbs
Lime ..... 15 lbs
Nitre ..... 20 lbs
Potash ..... 135 lbs
Red lead ..... 135 lbs
Cullet ..... 1200 lbs

Yellow Batch No. 1
Sand ..... 420 lbs
Lead ..... 145 lbs
Potash ..... 145 lbs
Soda ash ..... 115 lbs
Cullet ..... 1200 lbs

Yellow Batch No. 2
Sand ..... 200 lbs
Soda ..... 76 lbs
Borax ..... 15 lbs
Lime ..... 20 lbs
Nitre ..... 6 lbs

Alex ***[Alexandrite]***
Sand 200
Soda 72
Borax 15
Lime 10
Nitre 7

Green Batch No. 2
Sand ..... 900 lbs
Soda ..... 300 lbs
Potash ..... 50 lbs
Lime ..... 100 lbs
Nitre ..... 60 lbs
Cullet ..... 900 lbs

Rose Batch No. 1
Sand ..... 800 lbs
Soda ash ..... 320 lbs
Lime ..... 90 lbs
Cullet ..... 1200 lbs

Rose Batch No. 2
Sand ..... 700 lbs
Soda ash ..... 315 lbs
Lime ..... 80 lbs
Cullet ..... 1300 lbs

The following formulas are ones used or tried at the A. H. Heisey & Co. in Newark, OH. Most formulas begin about 1933 when Emmet Olson became Heisey's chemist. There are no formulas listed earlier than that for the early Heisey colors of Emerald, Opal, Ivorina Verde, Canary or early experimental colors.

Olson kept meticulous records of various formulas, and some surprises are contained in the following information.

The colors are presented here in the order in which they were put on the market by Heisey, beginning with Moongleam and ending with Limelight. There are also many formulas for lime glass and lead glass. In the cases of lime and lead, it is not always certain that these were used at Heisey, but attempts were made to separate out those which were definitely not used at the company. Notations given with the formulas were written on Olson's pages. Information in this type face is added for clarity. Numbers are assumed to be pounds unless otherwise noted.

Moongleam 5-11-31

Now being used

Sand	900
Soda	270
Potash	40
Lime	90
Nitre	40
Borax	23

notice no color ingredients are mentioned

Moongleam

	6-1-40		Jan. 1943
Sand	1125	900	900
Soda Ash	350	300	270
Potash	50	50	40
Lime	118	100	90
Nitre	65	60	40
Cullet	600	900	900
Arsenic	4½	4½	3½
Borax	3	3	23
Copper Scale	3½	3½	3½ oz.
Green Oxide Chrome	6 1/10	5	5 5/64 oz.

Flamingo 7-5-33

			1/1/40	
Sand	800	700	600	700
Soda Ash	370	315	235	252
Lime	90	80	70	70
Sodium Arsenate	7¾	7½	6½	7½
Sodium Selenite	3¾	3½	3	3½
Metallic Selenium	2	1¾	1½	1¼

Add 4 6/10 oz. of P. *[powdered]* Blue to make Hawthorne.

This is the only notation found for the color Hawthorne which was made for only one year.

Note: the 1-1-40 column had different numbers after Sodium Selenite and Metallic Selenium, as though these were changed. They were 2½ and 29 1/8 oz. respectively.

Marigold

		1/1943
Sand	420	416
Lead	170	122
Potash	260	122
Soda Ash	---	32
Lime	---	13
Nitre	---	18
Cullet	200	1235
Sodium Uranite	30	31
Titanium Oxide	10	10
Cadmium Sulphide	1	1
Salt	4	4

Lead Sahara 6-14-31

This one

Sand	600
Soda	24
Lime	12
Nitre	27
Borax	6
Red Lead	150
Potash	125
Cerium Hydrate	32
Titanium Oxide	32
Arsenic	3

Lead Sahara 8-4-31

Sand	300	300	300	300
Soda	24	24	40	24
Lime	6	6	6	6
Nitre	13	13	14	13½
Borax	3	3	3	3
Red Lead	91	75	75	75
Potash	75	62	62	62½
Cerium Hydrate	8	12	16	16
Titanium Oxide	15	18	7	16
Arsenic	---	1½	1½	1½

Sahara *[undated, but prior to 1943]*

Sand	500	200	500	600	600
Lead	40	66	---	---	---
Potash	---	20	---	---	---
Soda Ash	240	60	152	234	228
Borax	5	10	30	45	50
Nitre	25	6	12	18	15
Lime	35	---	40	60	35
Cullet	700	---	750	---	900
Cerium Hydrate	30	10	25	28	30
Titanium Oxide	10	5	11	12	10

Cullet 700-800

Sahara 1-1943

Sand	600	620
Soda Ash	152	215
Lime	12	43
Nitre	27	24
Borax	6	6
Cullet	700	1000
Cerium	33	31½
Titanium Oxide	32	12½
Red Lead	80	---
Potash	65	---
Arsenic	3	3

Cullet 700-800

Sahara *[Undated]*

	Large Batch	Small Batch
Sand	620	500
Soda	248	200
Lime	43	35
Nitre	28	22
Borax	6	5
Cerium Hydrate	31	27
Titanium Oxide	12½	10½
Cullet	---	900 lb.

Alexandrite *[Undated]*

Sand	200	100	600	500	250	500
Soda Ash	72	38	228	200	100	200
Borax	15	7½	45	5	2½	5
Lime	10	5	30	50	15	30
Nitre	7	3¼	19½	22	11	22
Lead	---	5	30	---	---	---
Cullet	---	---	---	400	200	400
Neodymium Oxalate	22	11	66	55	27½	55

For one pound of burned lime use 1.65 pounds of pure Calcium Products Co. Lime.

Alexandrite *Undated, but noted* "now"

Sand	500
Soda	200
Lime	30
Nitre	22
Borax	5
Cullet	400
Neodymium Oxalate	45
Arsenic	3
Nitre	6

Olson's Tangerine 9-27-33

Sand	400	200	100
Soda	190	95	48
Potash	40	20	10
Borax	8	4	2
Zinc Oxide	60	30	15
Copper Oxide Burnt	3	1½	¾
Metallic Selenium	2½	1¼	10 oz.
Cadmium Sulphide	5	2½	1¼

Tangerine 6-1-40 E. E. Olson

Sand	600#
Soda	220
Lime	62
Cadmium Sulfide	5
Metallic Selenium	1½
8 mesh	
Sugar	4
Needle Antimony	3

Substitute 25% of Soda ash with Potash.

Tangerine 3-31-51

Sand	786	600	786
Soda	153	195	173
Potash	50	25	50
Calcium Carbonate	129	62	129
Metallic Selenium	½	1½	1½
Sugar	---	---	---
Flowers of Sulfur	½	½	½
8 mesh			
Needle Antimony	---	3	---
Salt	---	---	---
Arsenic	1	1	1
Nitre	3	---	---

Our Stiegel Blue 5-5-33

	5-5-33		11-1-40	1943
Sand	585	600	785	600
Soda	152	210	273	152
Lime	12	60	129	22
Calcium Carbonate 22 *[this was added after lime, possibly in place of?]*				
Nitre	27	30	42	27
Arsenic	3	3	6 oz	3
Black Oxide Copper	45 oz.	45 oz.	45 oz	45 oz.
Powdered Blue	19 oz.	19 oz.	19 oz	19 oz.
Cobalt Black Oxide	19½ oz.	19½ oz.	19½ oz	19½ oz.
Borax	6#	---	1#	---
Potash	65#	---	---	---
Kryolite	---	---	3½#	---

the first column was also dated 7-8-54

Zircon

	6-1-40	6-1-40	1-10-51	1-11-51
Sand	600	900	600	600
Soda	160	270	180	126
Lime	60	90	60	---
Nitre	27	40	27	27
Borax	18	26	18	18
Potash	27	40	27	60
Arsenic	3	3½	3	1
P. Blue	2¾ oz.	3½ oz.	2.33 oz	2.34 oz.
Copper Scale	1.86 oz.	2 8/10 oz.	1.89 oz	1.86 oz.
Green Oxide Chrome	3.94 oz.	1.1 oz.	.74 oz.	1.1 oz.
Calcium Carbonate	---	---	100	100

Zircon 1-11-51, 12-3-51

	Green Side	Blue Side	Blue 1st	Blue 2nd	Green 3rd
Sand	600#	600	585	---	---
Soda	1.80#	126	180?	---	---
Potash	27#	60	22	---	---
Nitre	27#	27	27	---	---
Calcium Carbonate	98$	100	100	---	---
Borax	18#	18	10?	---	---
Arsenic	3#	1	2	---	---
Powdered Blue	3.5 oz.	3.5	?	2.93	2.34
Copper Scale	2.8	2.8	?	2.33	1.86
Green Oxide of Chrome	1.10	1.10	?	.84	3.94

Zircon #4 1955 Limelight

[same page as above with same initial quantities]

Powdered Blue	2.34 / 3.60
Copper Scale	1.86 / 1.20
Green Oxide of Chrome	1.97 / 1.10

Zircon 12-4-51 *[probably done during the development of Limelight]*

Sand	900
Soda	270
Potash	40
Nitre	40
Calcium Carbonate	90
Borax	26
Arsenic	3½
Powdered Blue	3½ oz.
Copper Scale	2.8 oz.
Green Oxide of Chrome	1.1 oz.

Amber 1-30-32, 12-3-51, 8-5-52 E. E. Olson

Sand	1000#
Soda	368#
Nitre	10#
Calcium Carbonate	50#
Borax	50#
Red Lead	150#
Metallic Selenium	6½#
Arsenic	3#

There were several notations and other values on this page, but it is uncertain as to how they were related to this formula.

Selenium Amber 1-1-43

	1-1-43	Now	1/15/50
Sand	1000	1000	1000
Soda	375	375	368
Feldspar	50	---	---
Lead	150	150	176
Calcium Carbonate	40	40	50
Borax	50	50	50
Arsenic	3	3	3
Metallic Selenium	6	6	6 oz.
Nitre	---	---	10

Amber (Lead) Dated 4-9-47, 1-22-48, 12-11-50--OK

Sand	1000#
Soda	368
Lead	150
Calcium	50
Borax	50
Nitre	10
Arsenic	8 oz.
Metallic Selenium	6#

Amber—New Experimental 5-10-49--Good, 12-29-49, 1955 OK

Sand	786
Soda	120 (changed from 155)
Potash	141
Calcium	129
Nitre	20
Carbon (Cotton)	30 (changed from 15)
Flowers of Sulphur	7
Cullet	50%

Amber Lead 12-4-51

Sand	1000
Soda	368
Nitre	10
Calcium Carbonate	50
Red Lead	150
Borax	50
Arsenic	3
Metallic Selenium	6

Cotton Amber 12-4-51

Sand	708
Soda	216
Potash	45
Calcium Carbonate	116
Cotton	20
Flowers of Sulphur	1½

Cotton Amber 1955?

Sand	708
Soda Ash	216
Nitre	10
Calcium Carbonate	116
Borax	50
Lead Monosilicate	176
Metallic Selenium	6½
Arsenic	3
Potash	45
Cotton	20
Flowers of Sulphur	1½

Selenium Amber 1955

Sand	974
Soda Ash	368
Nitre	10
Calcium Carbonate	50
Borax	50
Lead Monosilicate	176
Metallic Selenium	6½
Arsenic	3

Amber for Fred Harvey 2-11-55

Sand	974
Soda	368
Nitre	10
Cal. Carbonate	50
Borax	50
Lead Monosilicate	150
Met. Selenium	6.5
Arsenic	3

This entry for various dates beginning in October, 1952 is a graph representing various color formulas for "Smoke" from several different people. Apparently these were the precursors for Dawn.

	10-22-52 C. Reed Lead Smoke	10-22-52 R.R. Shively Lime Smoke	1-10-53 Pop Frasier Green	2-26-53 Dr. Shively Smoke	2-26-53 Dr. R.R. Shively Gill Lead
Sand	208	319	100#	1000#	887
Soda	16	89	28	375	298
Potash	63½	20	6½	---	---
Nitre	9½	17	---	10	40
Cal. Carb.	6½	52	16½	110	96
Red Lead	61	---	---	---	170
Black Oxide Nickel	---	2½ oz.	---	2¾ oz.	---
Red Oxide of Iron	6 ozs.	---	---	2¾ oz.	---
Powdered Blue	4/10 ozs.	---	---	9¾ ozs.	11 drams
Manganese Dioxide	---	20 oz.	---	---	1
Black Oxide Iron	---	---	2#	---	---
Antimony Oxide	---	---	3½	3	---
Feldspar	---	---	---	20	---
Borax	---	---	---	25	---
Arsenic	---	---	---	---	2# 13 oz.

Notes in the column "Pop Frasier" were "No arsenic, No nitre" and "Made from 1/7% our lime batch."

Dawn 2-26-53

Dr. R. R. Shiveley

The batch with 500 lbs. sand was also dated 12-8-53, 7-45, and 1-1-55.

Sand	1000	500
Feldspar	20	10
Calcium Carbonate	197	99
Soda Ash	375	188
Nitre	10	5
Borax	25	13
Antimony Oxide	6	3
Black Oxide Nickel	5½ oz.	2¾ oz.
Powdered Blue	19½ oz.	9¾ oz.

Smoke Glass from Sweden

This Dawn formula was found in another entry with the added ingredient of Burnt Lime of 110. The formula was dated both 2-26-53 and 1-1-55.

Limelight

	Blue side	Green side	Blue Side	Green side	Good Limelight
Sand	585#	---	---	---	---
Soda	180	---	---	---	---
Calcium Carbonate	107	---	---	---	---
Nitre	26	---	---	---	---
Borax	18	---	---	---	---
Potash	27	---	---	---	---
Arsenic	2	---	---	---	---
Powdered Blue	2.93 oz.	2.34	2.34	2.34	1.80
Copper Scale	2.32 oz.	1.86	1.86	1.86	1.20
Green Oxide Chrome	84 oz.	3.94	67	1.97	1.10

There were many formulas found for Lead and Lime batches. Included here are those that seem to have been used or at least experimented with at Heisey's.

LEAD

Lead E. W. Heisey to E. E. Olson

Sand	416	416	416	416	416
Soda Ash	35	32	31	---	32
Nitre	20	18	---	20	18
Lead	135	122	166	150	122
Potash	135	122	80	166	122
Cullet	1200	1200	---	1200	800
Lime	---	13	---	15	8
Ground Batch	---	35	---	---	---
Arsenic	2¾	2½	¾	¾	¾
Green Nickel Hydrate	---	---	---	---	---
Salt	---	---	---	3	---

This note is found on the last entry and seems to indicate that this was given to Emmet Olsen by Wilson Heisey when Olson began working as Heisey's chemist. If so, it is one of the earliest of the formulas.

Lead

	2-20-40	10-2-40	10-16-45
Sand	880	475	470
Soda	32	31	---
Potash	110	112	170
Nitre	18	35	35
Borax	¾#	¾#	¾#
Lime	13	12	12—calcium carbonate
Zinc Oxide	5	7	3
Lead	100	140	170
Arsenic	¾#	1	6 oz.
Magnesium Carbonate	---	8	8
Neodymium Carbonate	---	3½ oz.	---
Green Nickel	---	?	?

Lead 6-10-40

Sand	416
Soda	32
Nitre	18
Lead	122
Potash	122
Lime	13
Grd. Batch [?[	35
Arsenic	2½
Borax	¾
Cullet	1200

Ours E. W. Heisey & E. E. Olson

Lead Ca. 6-1940

Sand	380
Red Lead	100
Soda	60
Calcium	13
Potash	85
Nitre	18
Arsenic	¾
Zinc Oxide	5
Borax	¾

Neodymium Carbonate 1# to 1500# of sand

Sand	475
Red Lead	125
Soda	65
Calcium	16
Potash	113
Nitre	23
Arsenic	1
Zinc Oxide	6
Borax	¾

Lead 4-7-43

Sand	400
Soda	---
Potash	145
Nitre	30
Calcium Carbonate	11
Magnesium Carbonate	7
Zinc Oxide	3
Lead	145
Borax	---
Arsenic	---
Neodymium	---

G. H. H.

Lead Comparable To Our Lead 1-31-47

Sand	1000
Lead	400
Potash	300
Soda	60
Nitre	60
Crystal M-35	2½
Cerium	2

English Lead 1-31-47

Sand	1500	450
Lead	1000	300
Potash	540	156
Potassium Nitrate	45	13½
Sodium Nitrate	45	9
White Oxide of Antimony	4½	1# 5 oz.
Green Oxide of Nickel	5 grams	15 grains

Lead Used Today 4-9-47

	4-9-47	5-10-49	12-28-49	4-7-50
Sand	470#	414	414	414
Potash	170#	150	155	176
Calcium Carbonate	12#	10	---	---
Nitre	35#	31	31	20
Magnesium Carbonate	8#	7	---	---
Zinc Oxide	4#	3¼	3¼	---
Lead	170#	150	160	160
Arsenic	6 oz.	¾	¾#	¾#
Borax	¾#	¾#	¾#	¾#
Neodymium Carbonate	1 oz.	1 oz.	1 oz.	1 oz.
G. H. H.	6/10 oz.	6/10 oz.	6/10 oz.	4/10 oz.

Lead 18% 3-30-50

	3-30-50	6-10-53
Sand	416	416
Soda	16	32
Nitre	18	18
Red Lead	122	122
Potash	159	122
Lime	13	73
G. H.		

Lead In Furnace Now 7-16-50

	6-16-50 8-2-50	12-11-50	8-5-52
Sand	416	416	416
Soda	16	32	32
Potash	159	122	127
Nitre	20	18	19
Calcium	13	13	13
Red Lead	122	122	122

Lead In Furnace Now 7-20-50

Sand	400
Red Lead	55
Calcium Carbonate	22
Magnesium Carbonate	21
Soda	124
Potash	25
Nitre	16
Neodymium	1 oz.
Powdered Blue	3/10 oz.
Potassium Permanganate	½ lb.

Lead 12-4-51

Sand	416
Soda	32
Potash	127
Nitre	19
Calcium Carbonate	13
Red Lead	122
Neodymium	1 oz.
Borax	¾ lb.
Arsenic	3 oz.

Lead 1-1957

Sand	460
Soda	125
Potash	45
Calcium Carbonate	85
Nitre	20
Neodymium	1 oz.
Borax	¾
Sodium Silicofluoride	---
Potassium Permanganate	¾
Arsenic	½
Powdered Blue	2/10?
Lead Monosilicate	88

Lead Experimental 11-13-53

Sand	429	433	433
Soda	117	92	92
Potash	50	60	60
Nitre	20	20	20
Calcium Carbonate	86	116	91
Powdered Blue	5/10 oz.	3/10 oz.	---
Potassium Permanganate	17 oz.	¾#	---
Arsenic	1	½#	---
Lead Monosilicate	100	70	70
Borax	---	20	20
Magnesium Oxide	---	---	10

Lead 12-8-53

Sand	429
Soda	149
Potash	---
Nitre	20
Calcium Carbonate	86
Neodymium	1 oz.
Borax	---
Sodium Silicofluoride	---
Potassium Permanganate	1#
Arsenic	1#
Powdered Blue	3/10 oz.
Lead Monosilicate	100
Antimony Oxide	---
Feldspar	---
Black Oxide of Nickel	---

Lead 1955

Sand	436
Soda Ash	115
Potash	45
Nitre	20
Calcium Carbonate	116
Neodymium Carbonate	1 oz.
Borax	½
Potassium Permanganate	¾
Arsenic	½
Powdered Blue	2/10 oz.
Lead Monosilicate	50

undated formula and cost analysis

Lead Special Pot #3

Sand	433
Soda	92
Potash	60
Nitre	20
Calcium Carbonate	116
Neodymium	2 oz.
Borax	20
Potassium Permanganate	¾
Arsenic	½
Powdered Blue	3/10 oz.
Lead Monosilicate	50

Cost per pound of finished glass $.0344

Handwritten dissertation about Heisey's glass and how to improve it. Unsigned and undated.

"Your present lead batch is

Sand	376
Red Lead	146
Potash	136
Nitre	28
Zinc Oxide	3

"If we were to simplify this batch and soften it a little by increasing the total alkali it is conceivable that the tendency to cords might be minimized. This batch might be given some consideration to gain this result.

Sand	376	.. Silica 61.4% *
Red Lead	146	. Lead Oxide 23.2
Potash	155	Potassium Oxide 14.2
Nitre	20	Sodium Oxide 1.1
Arsenic	trace	
Decolorizer	q.s.	

*This would give a glass of this composition.

"This is about 1.0% higher in total alkali than your present glass."

LIME

Lime Now being used 5-11-31

Sand	1125
Soda	370
Lime	118
Nitre	60

Lime *[undated, but early, possibly ca. late 1930s]*

Sand	1125	---
Soda Ash	390	370 hundwt.
Lime	118	---
Nitre	60	---
Cullet	1350	1050 hundwt.
Manganese	1½ lbs.	
Borax	1½ lbs.	
Arsenic	1½ lbs.	
Powdered Blue	1½ oz.	

Bottom Color
Manganese—Use your best judgment
Powdered Blue—Use your best judgment

Lime

Carl Reed—Lancaster, Ohio *[Sharp-Shurtz Co.]*

	5-10-40	4/1/50 1/1/50	1953	Cup Lime 1955
Sand	1125#	708	825	708
Soda Ash	390#	197	246	147
Nitre	60#	38	47	38
Calcium Carbonate	185#	116	145	116
Borax	1½#	1	1	55
Sodium Silicofluoride	5#	1½	1½	1½
Arsenic	8 oz.	½	4 oz.	½
Potassium Permanganate	26 oz.	1#	1	1
Neodymium Carbonate	6 oz.	1 oz.	1 oz.	1 oz.
Cullet	1450	---	---	---
Potash	---	45	56	45
Powdered Blue	---	2/10 oz	4/10 oz.	2/10 oz.

Lime 1-31-47

		High
Sand	1000#	500
Soda	400#	200
Calcium Carbonate	190#	95
Borax	70#	35
Feldspar	25#	---
Cerium Hydrate	2#	1#
Crystal #35	3½#	1¾#
Powdered Blue	½ oz.	¼ oz.
Nitre	70	35
Potassium Permanganate	¾ oz.	---

#3 Pot

Lime Used Today 4-9-47

	4-9-47	5-10-49	4-7-50
Sand	786#	708	708
Soda	213#	202	197
Potash	50#	45	45
Calcium	129#	116	116
Nitre	42	38	38
Sodium Siliofluoride	1½#	1½	1½
Neodymium Carbonate	1 oz.	1 oz.	1 oz.
Borax	1#	1#	1#
Arsenic	6 oz.	4 oz.	4 oz.
Powdered Blue	4/10 oz.	4/10 oz.	4/10 oz.
Potassium Permanganate	1# plus	1	1@

Special Lime Glass 5-10-49
Carl Reed

	Pot #5		Pot #16
Sand	100	400	600
Potash	34	136	204
Calcium Carbonate	30	120	102
Nitre	3	12	18
Borax	2	8	12
Soda Ash	2	8	12

Lead Decolorizer

Lime 4-1-50

	4-1-50 1955	1953
Sand	708	885
Soda Ash	197	246
Nitre	38	47
Calcium Carbonate	116	145
Borax	1	1
Sodium Silicofluoride	1½	1½
Arsenic	½	4
Potassium Permanganate	1#	1
Neodymium Carbonate	1 oz.	1 oz.
Potash	45	56
Powdered Blue	2/10 oz.	4/10 oz.

Cullet

Lime 12-4-51

Sand	708
Soda	197
Potash	45
Nitre	38
Calcium Carbonate	116
Neodymium	1 oz.
Borax	1 lb.
Sodium Silicofluoride	1½
Potassium Permanganate	1¼ lb.
Arsenic	4 oz.
Powdered Blue	4/10 oz.

Lime 12-8-53, 7-54, 1-1-55

		Cup
Sand	708	708
Soda	197	147
Potash	45	45
Nitre	38	38
Calcium Carbonate	116	116
Neodymium	1 oz.	1 oz.
Borax	1#	55
Sodium Silicofluoride	1½#	1½#
Potassium Permanganate	1#	1#
Arsenic	½#	1#
Powdered Blue	3/10 oz.	3/10 oz.

Lime 1-1957

Sand	708
Soda	197
Potash	45
Calcium Carbonate	116
Nitre	38
Neodymium	1 oz.
Borax	1
Sodium Silicofluoride	1½
Potassium Permanganate	1
Arsenic	½
Powdered Blue	2/10?

The following formulas were used at Heisey, but some only in very small quantities such as monkey pots for experimentation only. The only known colors in existing pieces of glass are several black pieces and a Gold Ruby Carcassonne water pitcher. Heisey pieces are known in other experimental colors, but no formulas for these were found.

Black Batch
Dr. R. R. Shively

Sand	500#	490
Soda	200	
Lime	37½	67#
Fluorspar	20	
Lead	45	53#
Manganese	15	
Bichromate Soda	2½#	
Black Oxide Nickel	2½#	
Copper Oxide	3#	
Borax	15#	
Nitre	20#	

To make darker increase about 20% if the items checked.

While the above formula was not noted with a date, it is very likely this was the recipe for Heisey's experimental black. Heisey black is cobalt blue based, so this conclusion seems valid.

Cream Opalescent

		12-28-49
Sand	100	300
Potash	5	15
Soda	30	90
Borax	5	15
Zinc Oxide	5	15
Cryolite (Sodium Silicofluoride)	5	15
Bone Ash	10	30
Nitre	2	6
Arsenic	½ oz.	½ oz.
Cerium Hydrate	---	9
Titanium Dioxide	---	4½

Experiment #10

Sand ..... 42#
Lead ..... 12#
Potash ..... 12#
Soda ..... 3½#
Lime ..... 1¼#
Nitre ..... 2#
Sod. Urnanate ..... 3#
Cerium ..... 4#
Tit. Oxide ..... 1#
Cad. Sulp. ..... 1/10#
Salt ..... 4/10#
Gold ..... 2½ PW
Too Green.
Yellow green or yellow with a tint of green
Very pretty.

Nothing is known in this particular color, and it appears to have been only made in a monkey pot due to the small amounts of ingredients.

Gold Ruby 3-26-31
R. R. Shively

Gold Ruby Experiment No. 7, spec.--#3
Sand ..... 27½ lbs.
Red Lead ..... 25 lbs.
Potash ..... 7½ lbs.
Nitre ..... 3 lbs.
White Oxide of Antimony .... 11 oz.
Manganese ..... 4¾ oz.
Cerium Hydrate ..... 1½ lbs.
Titanium ..... 9½ oz.
Gold ..... 3 P-W
Too dark—cut out or down on some of the materials

Flash Ruby 5-27-31
Dr. R. R. Shively

Sand	1000 lbs.	500
Soda	400 lbs.	190
Zinc Oxide	170 lbs.	85
Cryolite	8 lbs.	4
Flurospar	8 lbs.	4
Bone Ash	10 lbs.	5
Arsenic	2 lbs.	1
Cadium Sulphide	7 lbs.	6
Selenium	3½ lbs.	3
Borax	---	20
Red Oxide of Copper	---	1 oz.
Sulphur	---	2 oz.

Gold Ruby 1-31-47

	1-31-47	2-1-47	2-3-47	---	2-10-47
Sand	20#	10#	5#	10#	10
Lead	13½#	6¼#	3½#	8#	5¾
Potash	8#	5#	2½#	5#	3½ oz.
Tin Oxide	1½#	---	10 oz.	1¼	1¼
White Oxide of Antimony	2 oz.	1 oz.	½ oz.	1 oz.	1 oz.
Arsenic	---	---	1 oz.	---	---
Gold	14 grams	7 gr	3½ gr.	7 gr	6 gr

3 oz. Hydrochloric Acid
1 oz. Nitric Acid
Dissolve Gold

Green Casing Glass

	1-31-48	2-1-47	2-2-47	2-3-47	2-10-47
Sand	20	10	5	10	10
Lead	13½	6¼	3½	8	6¾
Potash	7½	5	2½	5	3½
Nitrate of Potash	2	1	½	1	6 oz.
Bichromate of Potash	1½	---	---	½	½
Iron Oxide	1½	---	---	½	½
Black Oxide of Copper	1½	---	---	1 oz.	6 oz.
Arsenic	---	---	1 oz.	1 oz.	1 oz.
	Raw	Used Cullet	Used Cullet	Raw	---

Moonstone Glass Batch 10-28-40
Carl Reed

Sand	300
Soda	91
Aluminum Hydrate	65
Nitre	30
Feldspar	55
Potassium Perm.	6
Bone Ash	8½
Borax	6
Kryolith	11
Litharge	60
Meltopax	11—try without

A very few items (stemware) are known with moonstone (translucent opal) stems.

Peach Blow 4-9-47
E. E. Olson

Sand	786#
Soda	141#
Potash	121#
Calcium	129#
Nitre	35#
Sodium Silicofluoride	1½#
Borax	1#
Aresnic	6 oz.
Metallic Selenium	5#, 14 oz.

On 12-3-51—reduced metallic selenium to 2# and added 1# cadmium sulphide

White

	6-1-40	6-1-40	9-27-54	9-27-54
Sand	1000	1000	5000	100
Feldspar	250	250	125	27
Fluorspar	200	200	100	14
Zinc	25	75	38	2
Lead	60	6-	3-	8
Pearl Ash	50	150	75	---
China Clay	25	25	13	---
Arsenic	2½	2½	1¼	---
Manganese	1	1	½	---
Uranium	---	9	---	---
Metallic Selenium	---	---	3	---
Sodium Aluminum Chloride	---	---	---	20
Brytes	12½	---	---	½

Yellow Opal 12-22-53
Dr. R. R. Shively

	Yellow Opal	Orange Opal	Orange Opal	2-9-55
Sand	1000	400	80	212
Feldspar	300	160	32	132
Soda Ash	300	132	25	50
Borax	45	10	2	78
Fluorspar	150	85	17	45
Nitre	---	---	---	11
Zinc Oxide	150	65	13	47
Cryolite	30	---	---	25
Aluminum Hydrate	---	---	---	54
China Clay	---	---	---	12
Cadmium Sulphide	15	15	3	10
Sodium Silicofluoride	---	12	3	---
Antimony Oxide	---	65*	1	---
Arsenic	---	2	4	---

*changed to 5