

REFRACTIVE INDEX GRAPHS

MPR E-Scan Microprocessor Refractometer

The graphs in this document show the Refractive Index versus Percent Mass for various applications of the E-Scan Refractometer. The graphs are in alphabetical order and can be more easily navigated by using bookmarks. The information in this document is intended for use only as a reference for trends and not for determining exact values.

Designed and Manufactured by

THE ELECTRON MACHINE CORPORATION

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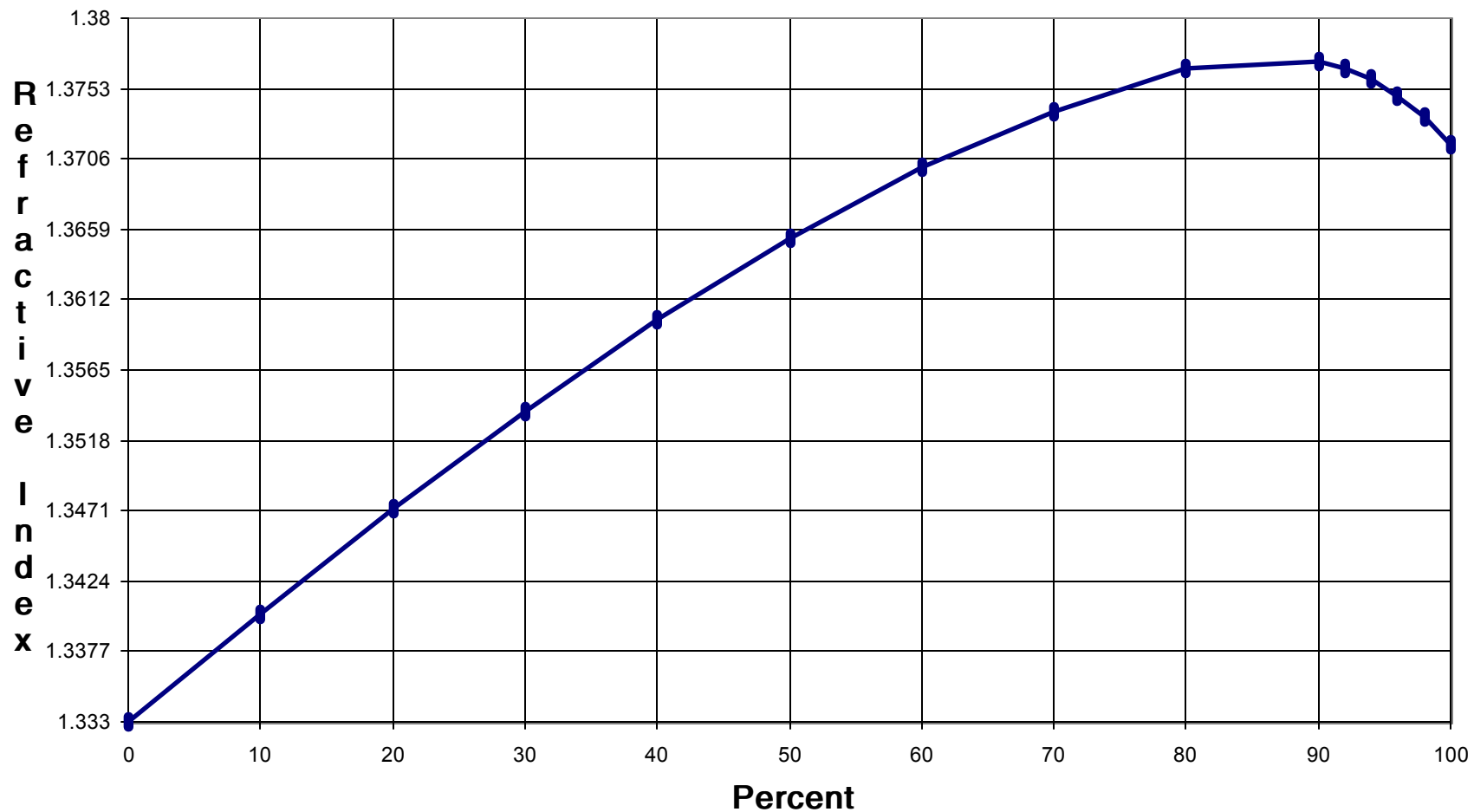
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<http://www.electronmachine.com>

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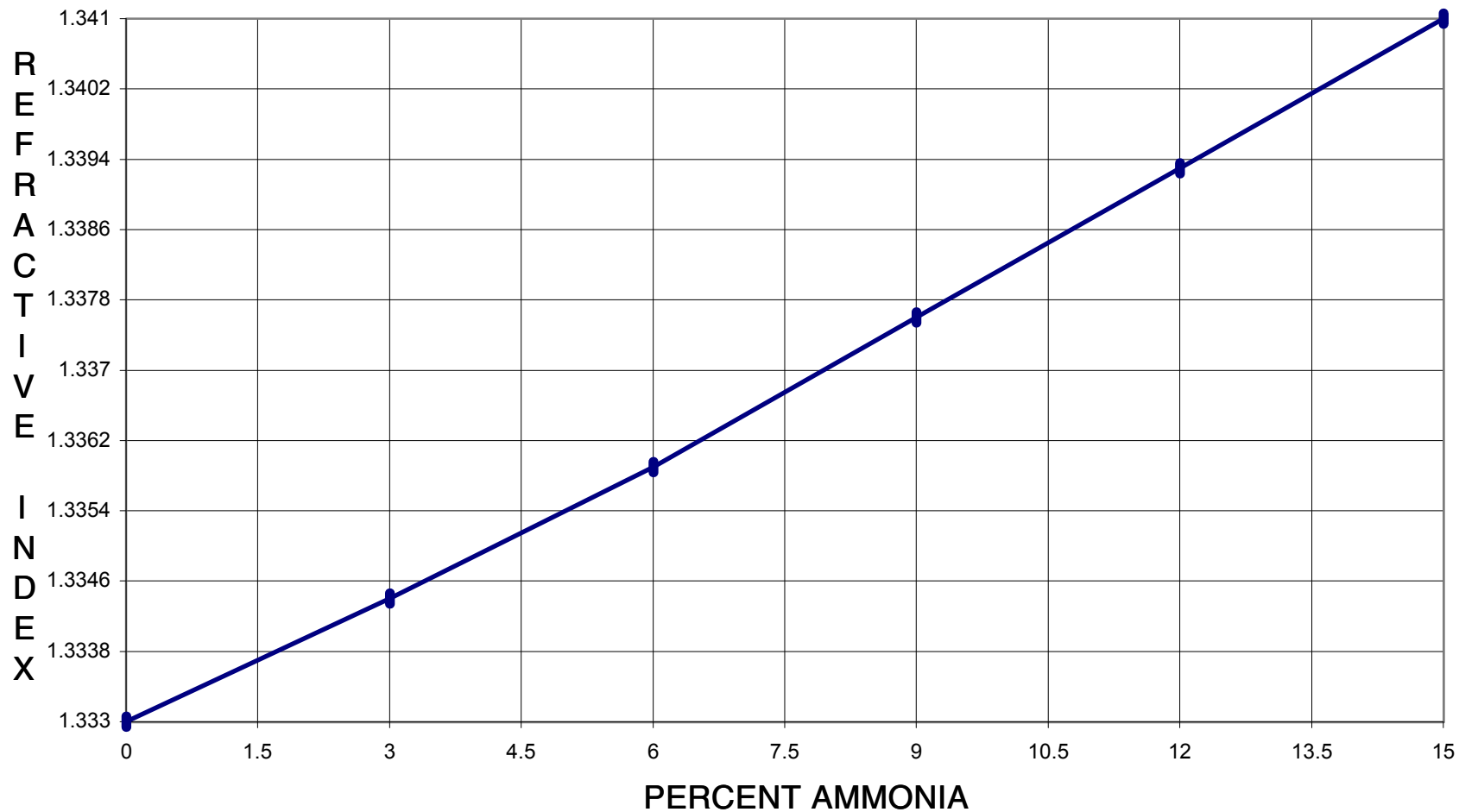
Acetic Acid 0-100

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 8/30/2000	0	1.333	50	1.3653	92	1.3766				
Test: AceticAcid	10	1.3402	60	1.37	94	1.3759				
Chem:	20	1.3472	70	1.3738	96	1.3748				
Instr: CRC	30	1.3537	80	1.3767	98	1.3734				
	40	1.3598	90	1.3771	100	1.3716				



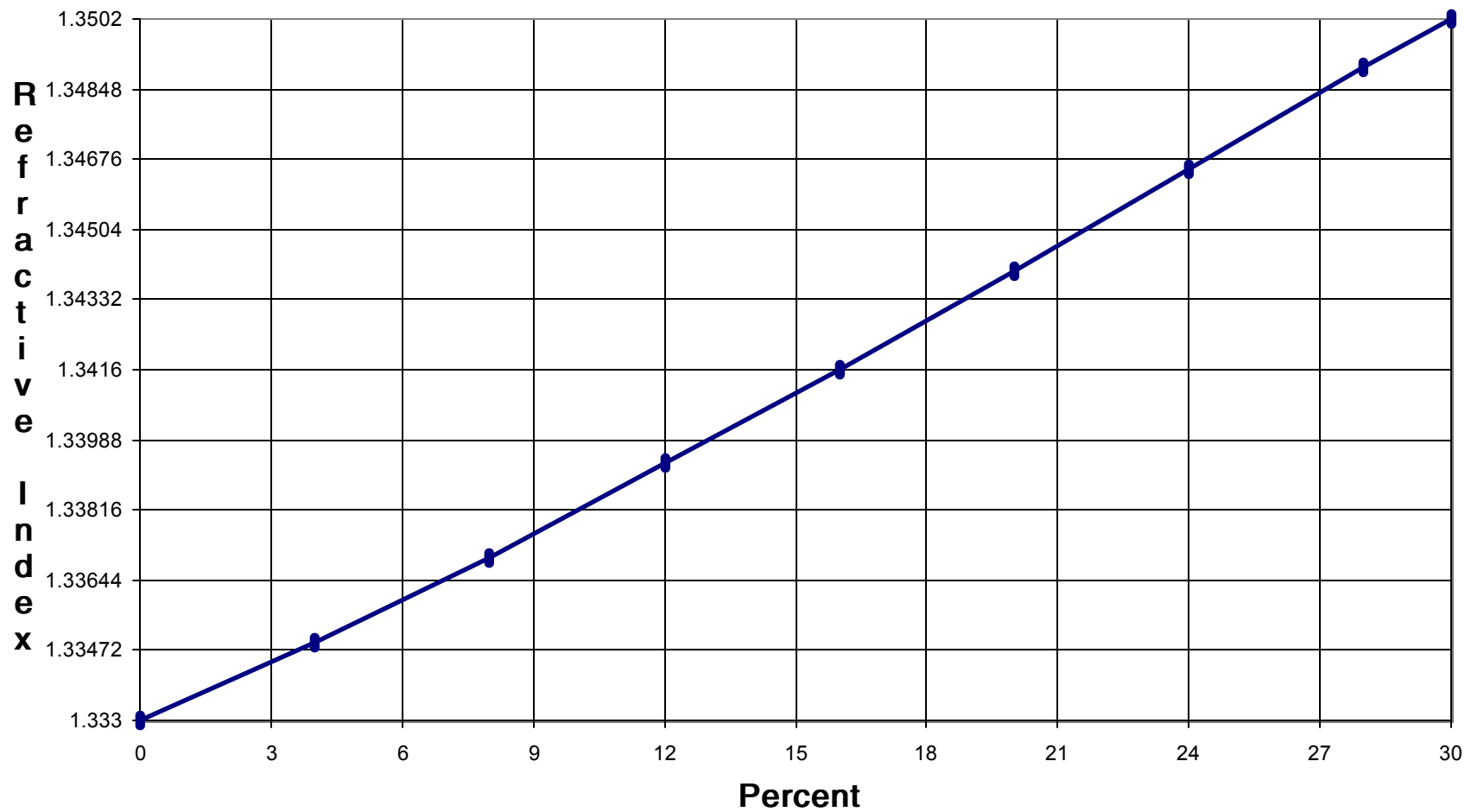
AMMONIA AND WATER

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 9/14/98	0	1.333	15	1.341						
Test: AMMONIA	3	1.3344								
Chem:	6	1.3359								
Instr: CRC	9	1.3376								
	12	1.3393								



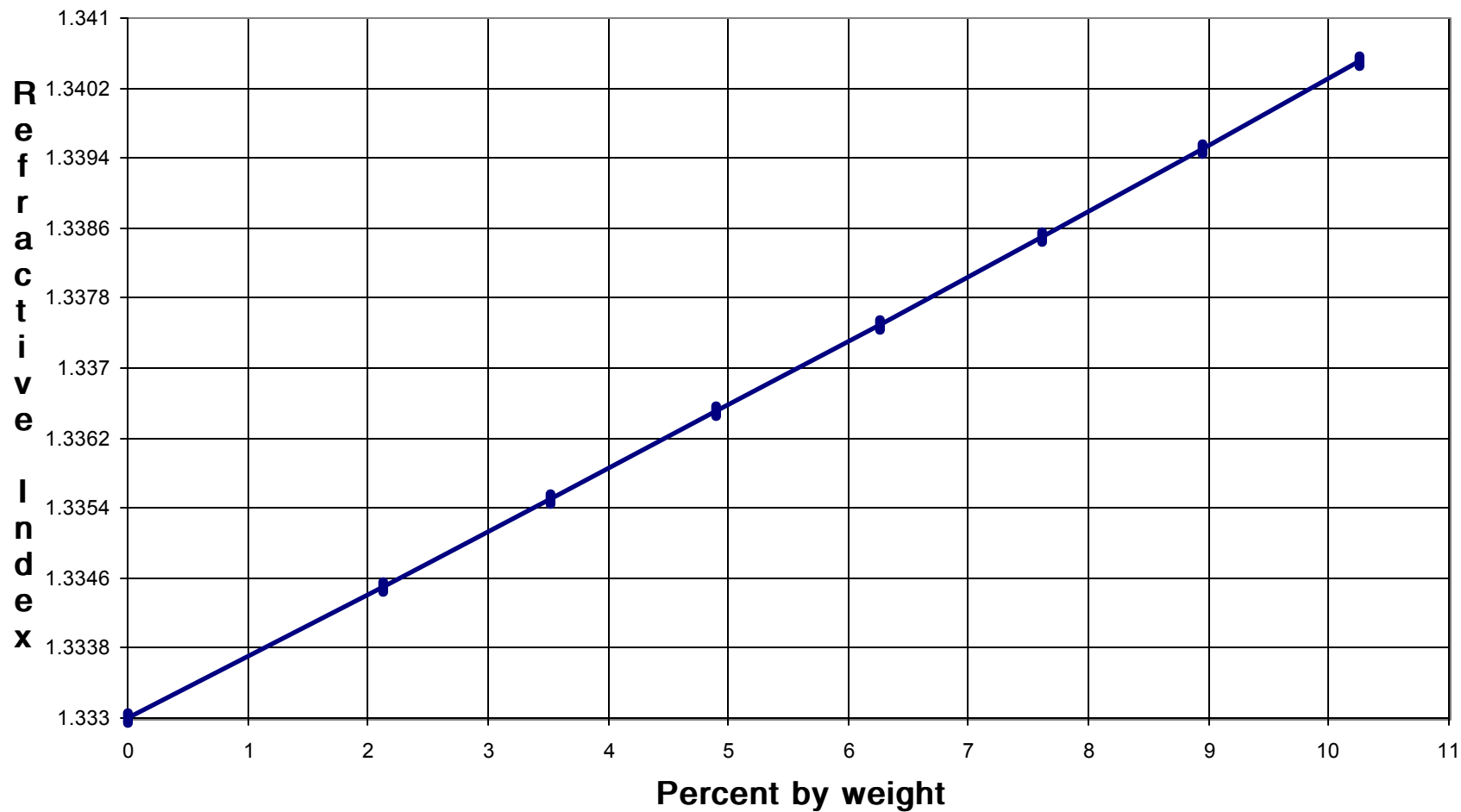
Ammonia 0-30%

	X	Y	X	Y	X	Y	X	Y	X	Y
Electron Machine	0	1.333	20	1.344						
Date: 8/30/2000	4	1.3349	24	1.3465						
Test: AMMONIA-1	8	1.337	28	1.349						
Chem:	12	1.3393	30	1.3502						
Instr: CRC	16	1.3416								



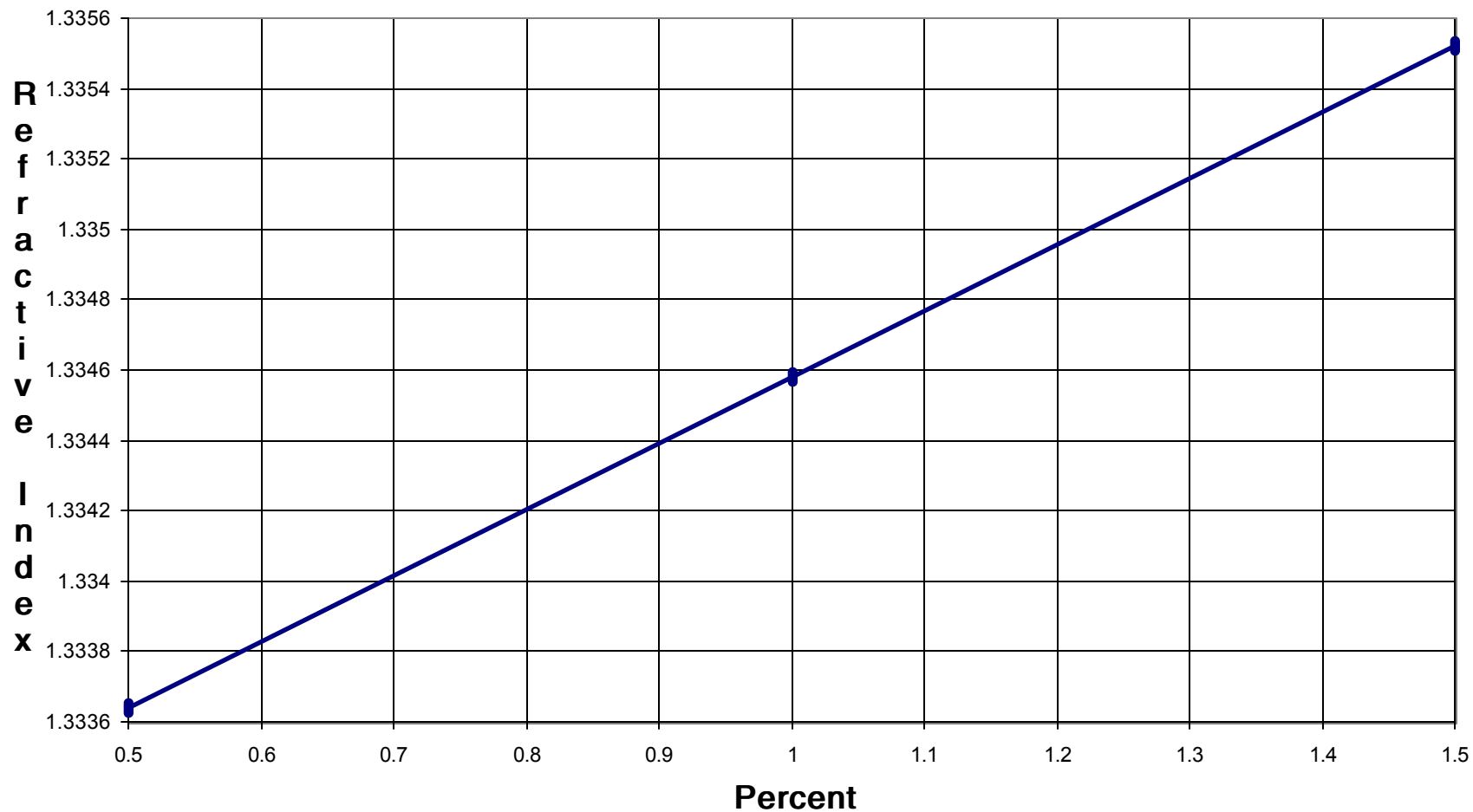
Acetone

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 5/17/90	0	1.333	7.61	1.3385						
Test: S-100A	2.12	1.3345	8.94	1.3395						
Chem: CH ₃ COCH ₃	3.52	1.3355	10.25	1.3405						
Instr: Lab Refract	4.9	1.3365								
	6.26	1.3375								



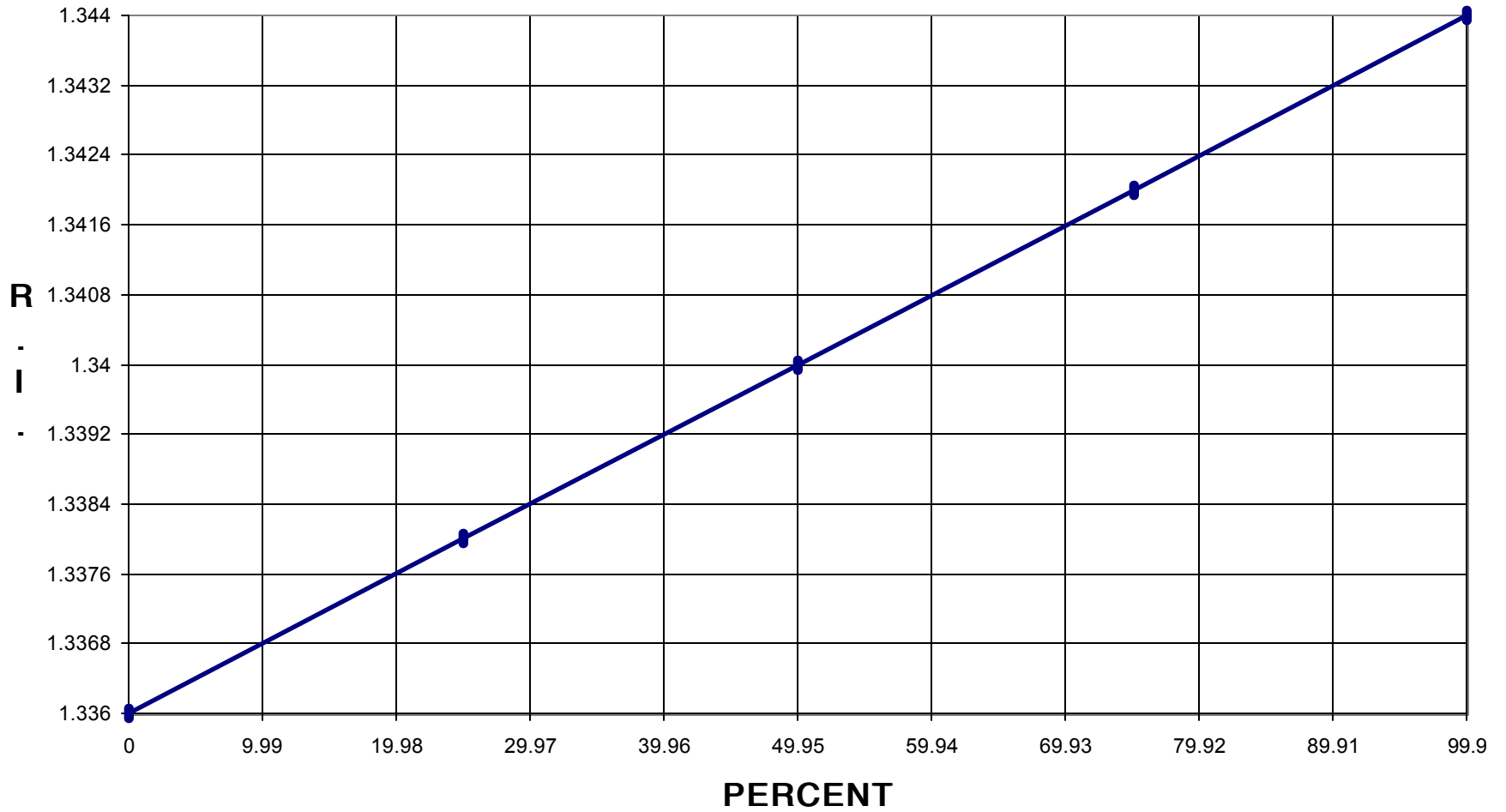
ASPARTAME

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 8/31/2000	0.5	1.33364								
Test: ASPARTAME	1	1.33458								
Chem: 1.5	1.5	1.33552								
Instr: ABBE 11										



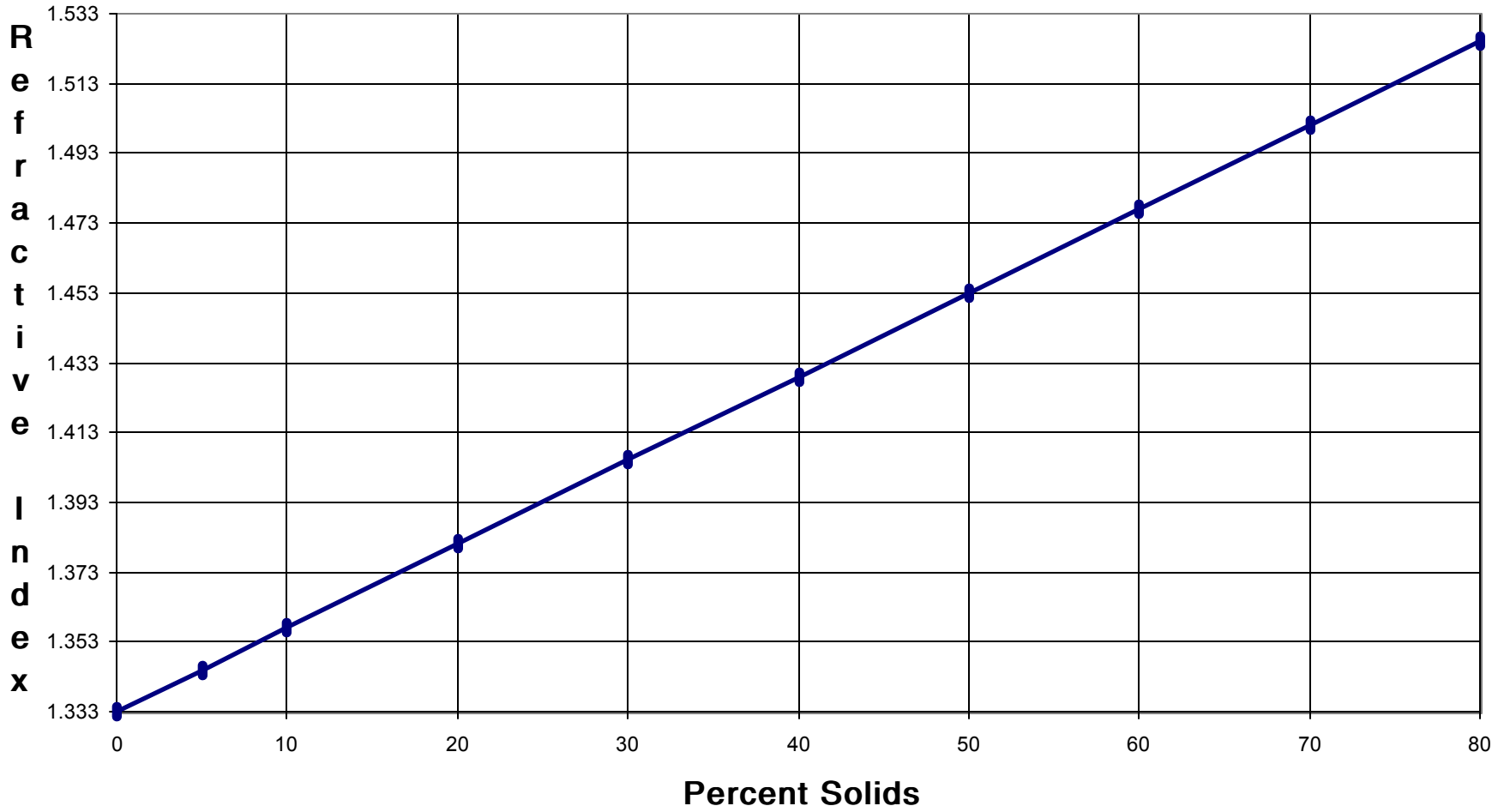
BEER

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 12/3/96	0	1.336								
Test: BUD	25	1.338								
Chem:	50	1.34								
Instr:	75	1.342								
	99.9	1.344								



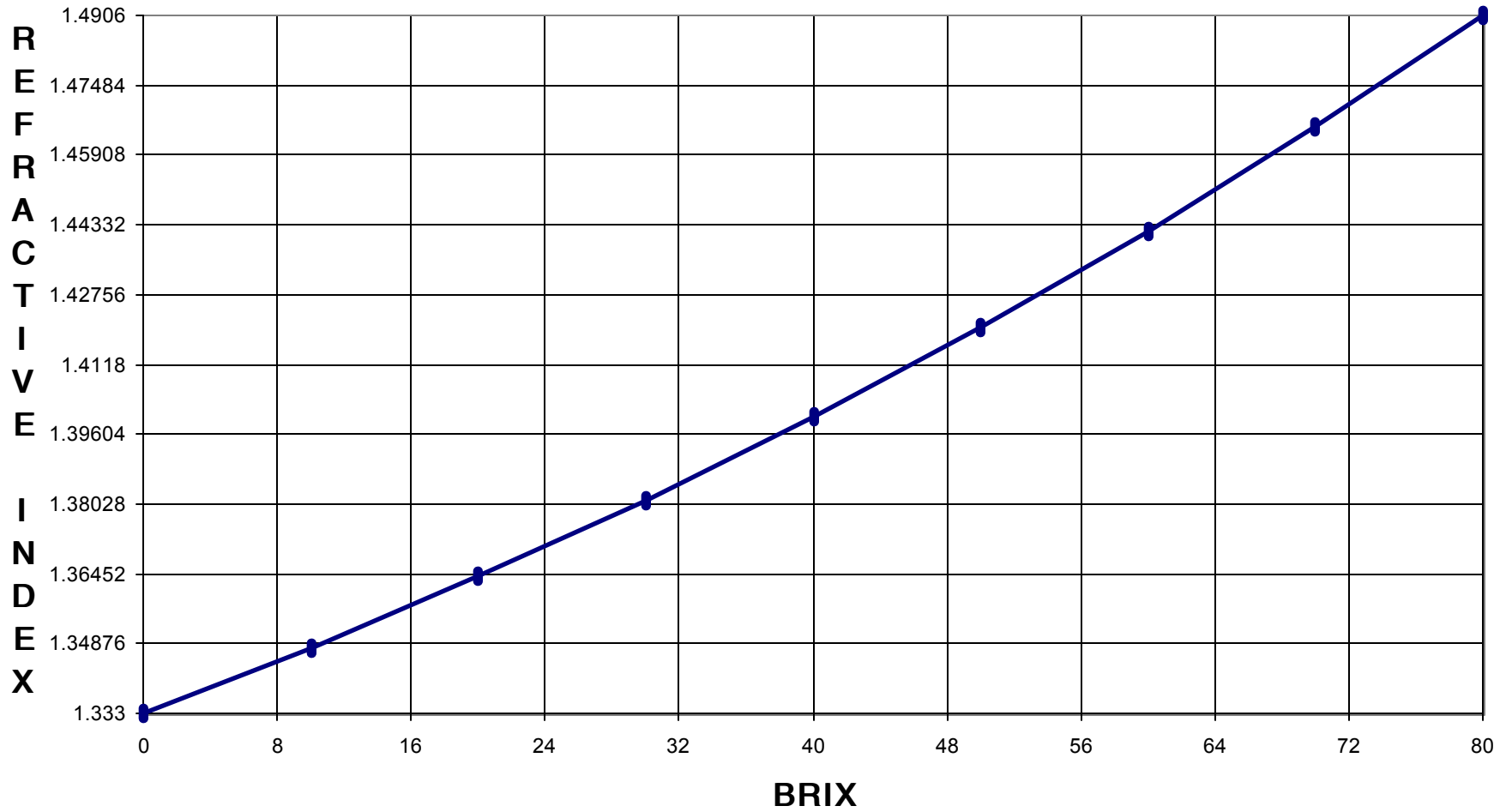
Black Liquor

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 8/27/91	0	1.333	40	1.429						
Test: S-123	5	1.345	50	1.453						
Chem:	10	1.357	60	1.477						
Instr: Refract	20	1.381	70	1.501						
	30	1.405	80	1.525						



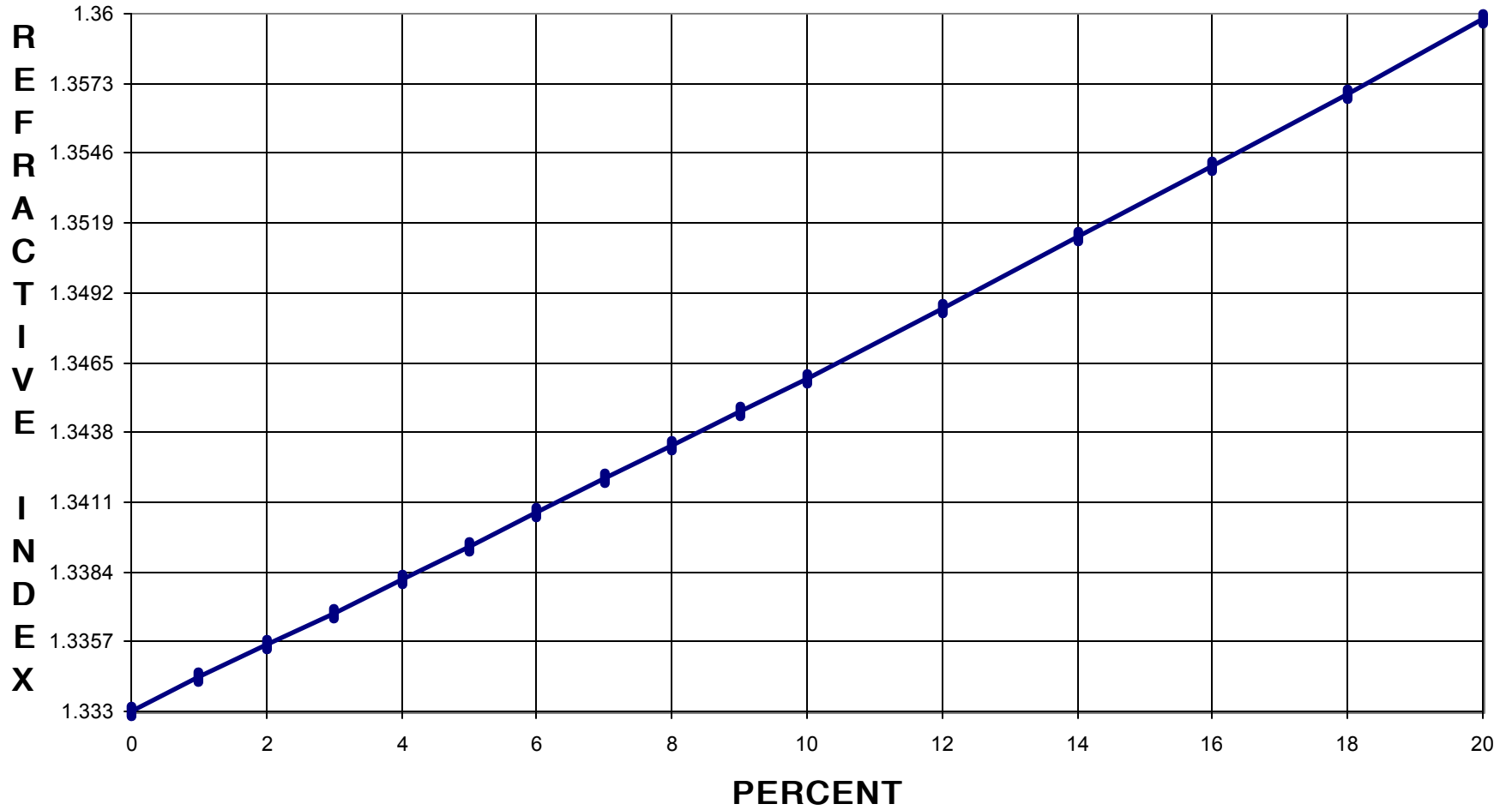
BRUX/REFRACTIVE INDEX

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 2/5/98	0	1.333	50	1.42						
Test: S-129C	10	1.3478	60	1.4418						
Chem: sucrose	20	1.3638	70	1.4653						
Instr: MPR E-Scan	30	1.3811	80	1.4906						
	40	1.3998								



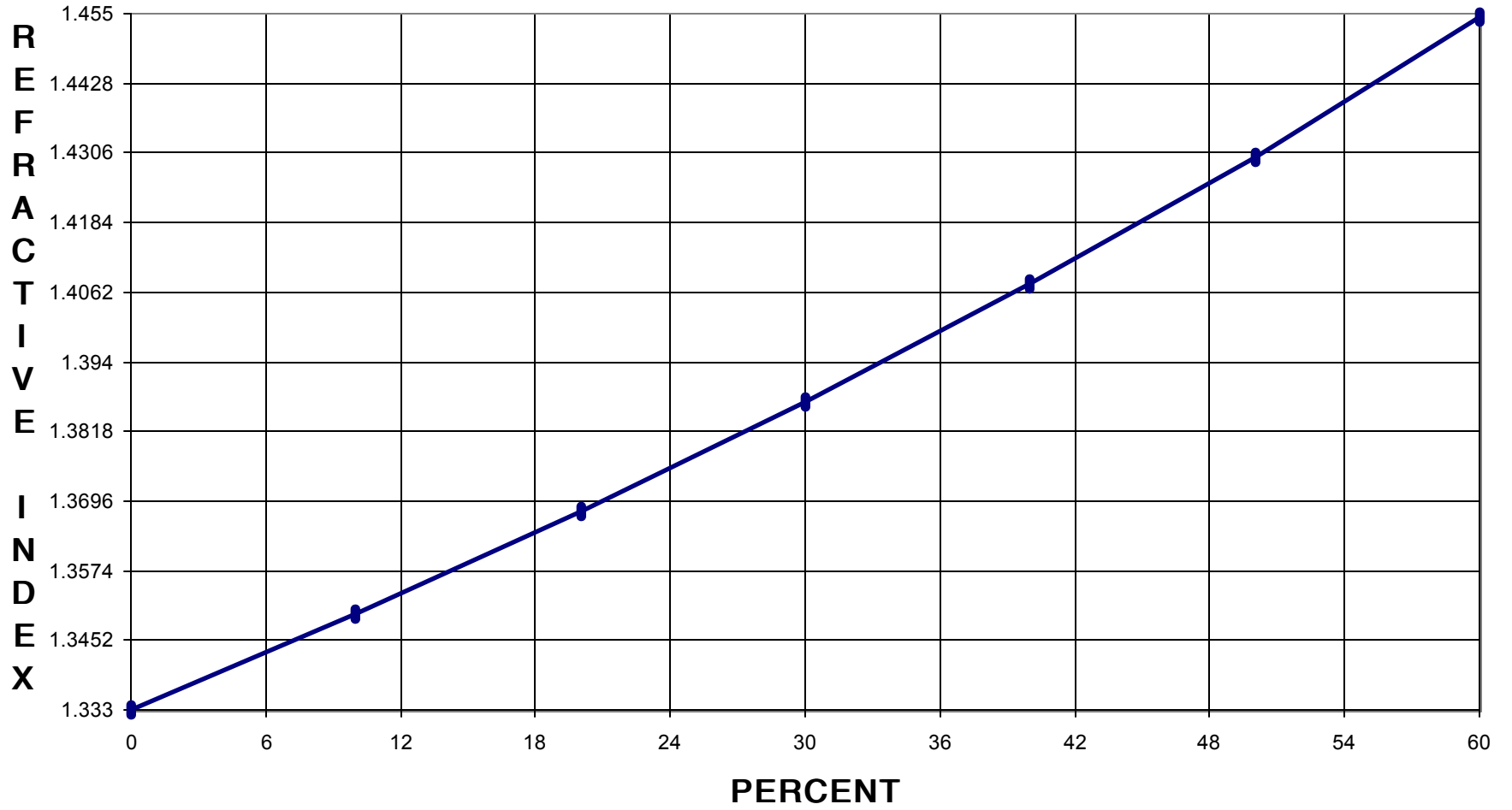
Citric Acid

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 2/5/99	0	1.333	5	1.3394	10	1.3459	20	1.3598		
Test: Citric	1	1.3343	6	1.3407	12	1.3486				
Chem:	2	1.3356	7	1.342	14	1.3514				
Instr: Abbe II/ CRC	3	1.3368	8	1.3433	16	1.3541				
	4	1.3381	9	1.3446	18	1.3569				



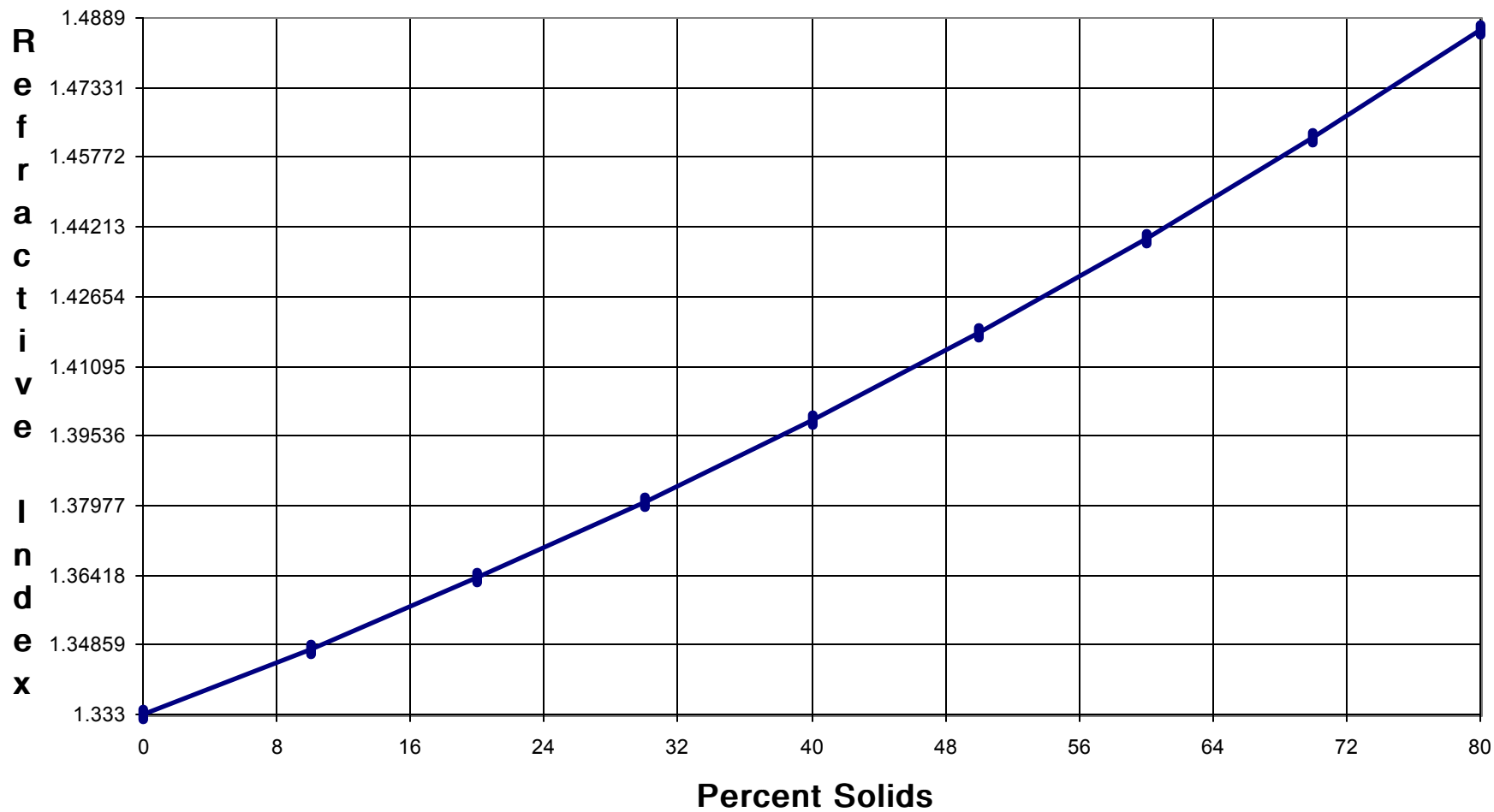
INSTANT COFFEE

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 1/27/99	0	1.333	50	1.42976						
Test: COFFEE-1	10	1.34984	60	1.45452						
Chem:	20	1.36776								
Instr: ABBE	30	1.38697								
	40	1.40764								



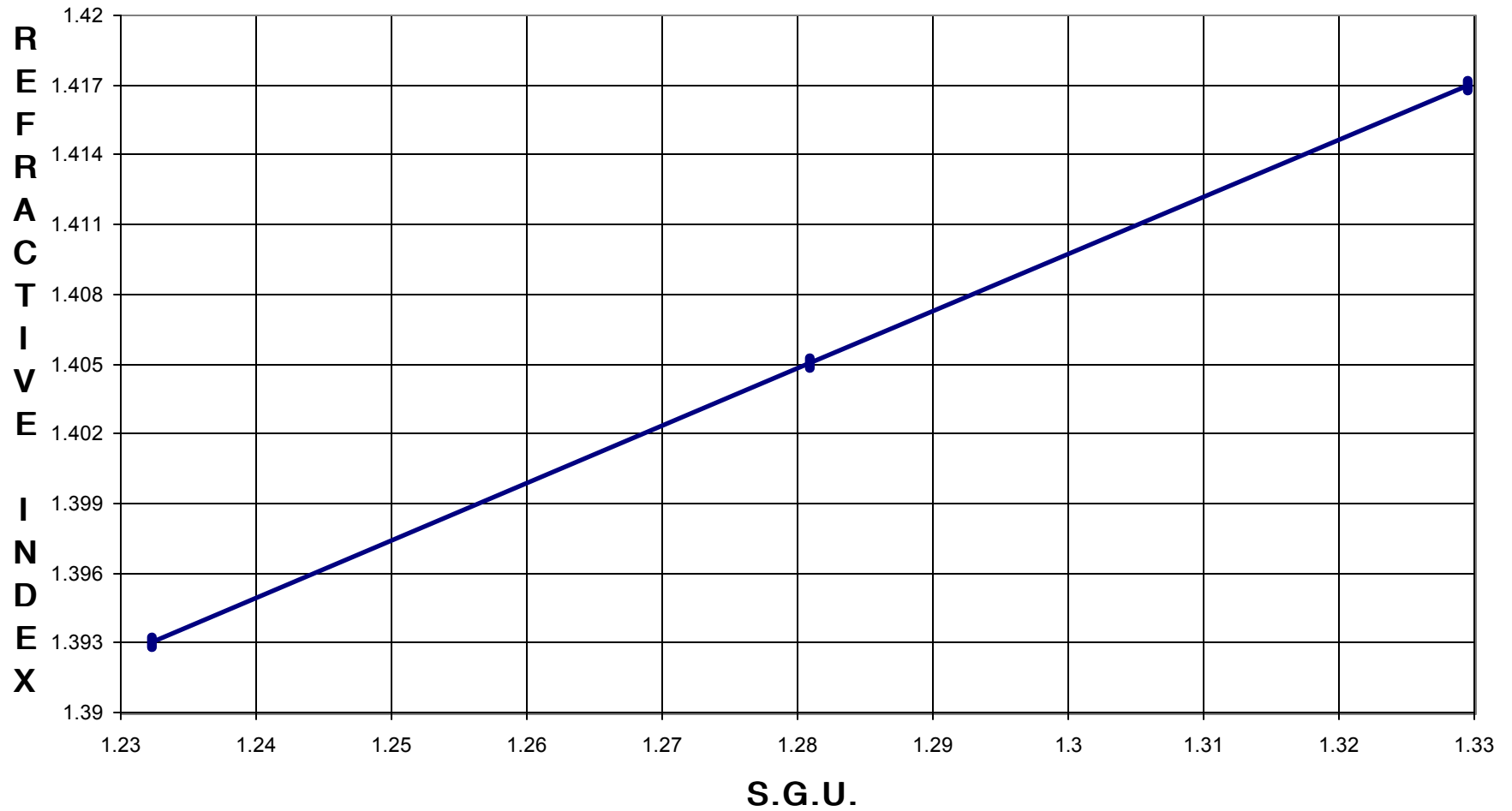
Corn Syrup

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 11/2/90	0	1.333	50	1.4185						
Test: S-110	10	1.3477	60	1.4395						
Chem:	20	1.3636	70	1.4621						
Instr: MPR-83	30	1.3806	80	1.4862						
	40	1.3989								



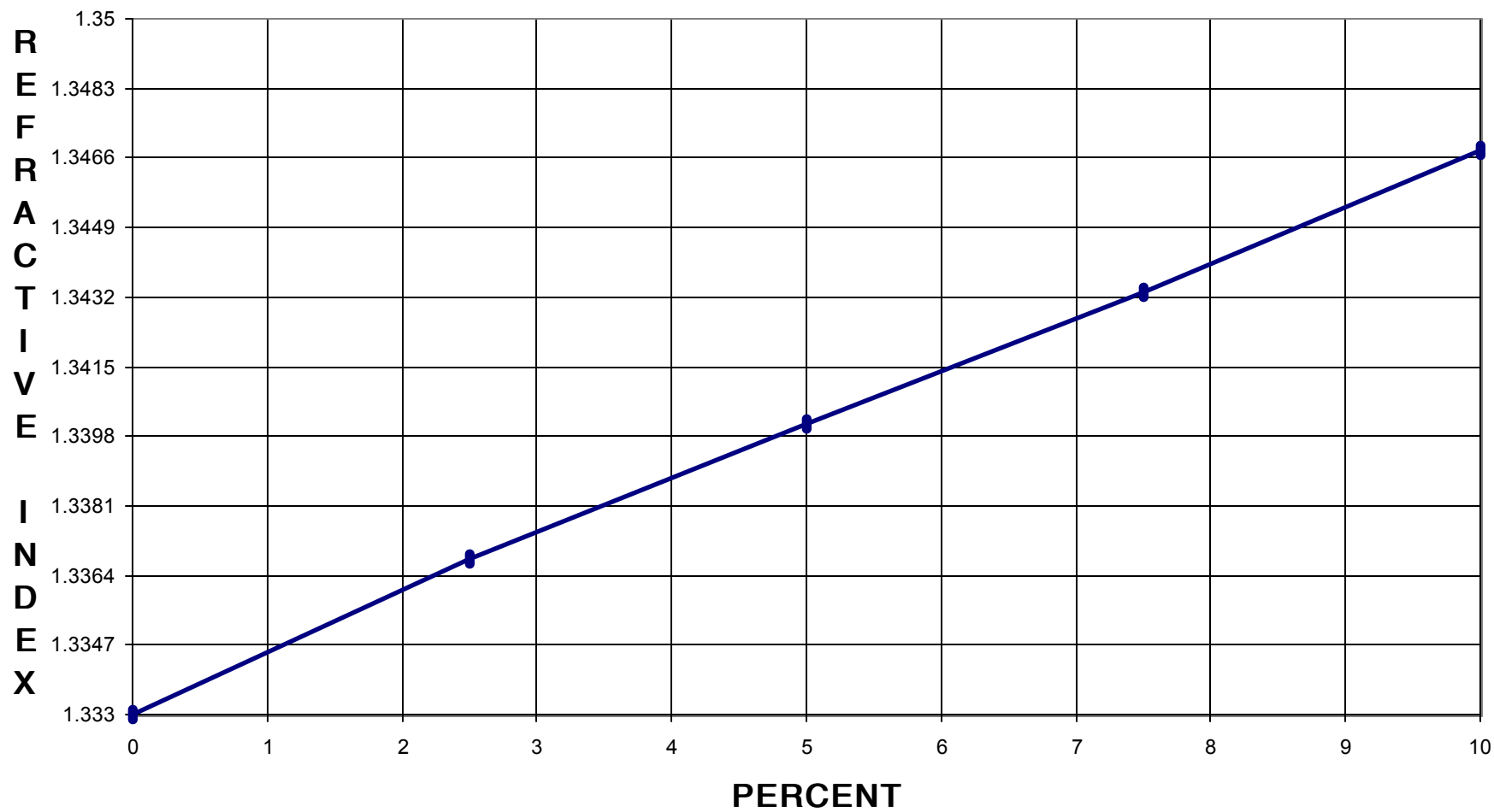
CUPRIC CHLORIDE

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 2/10/99	1.2323	1.393								
Test: CUPRIC	1.2809	1.405								
Chem:	1.3295	1.417								
Instr: MPR-ESCAN										



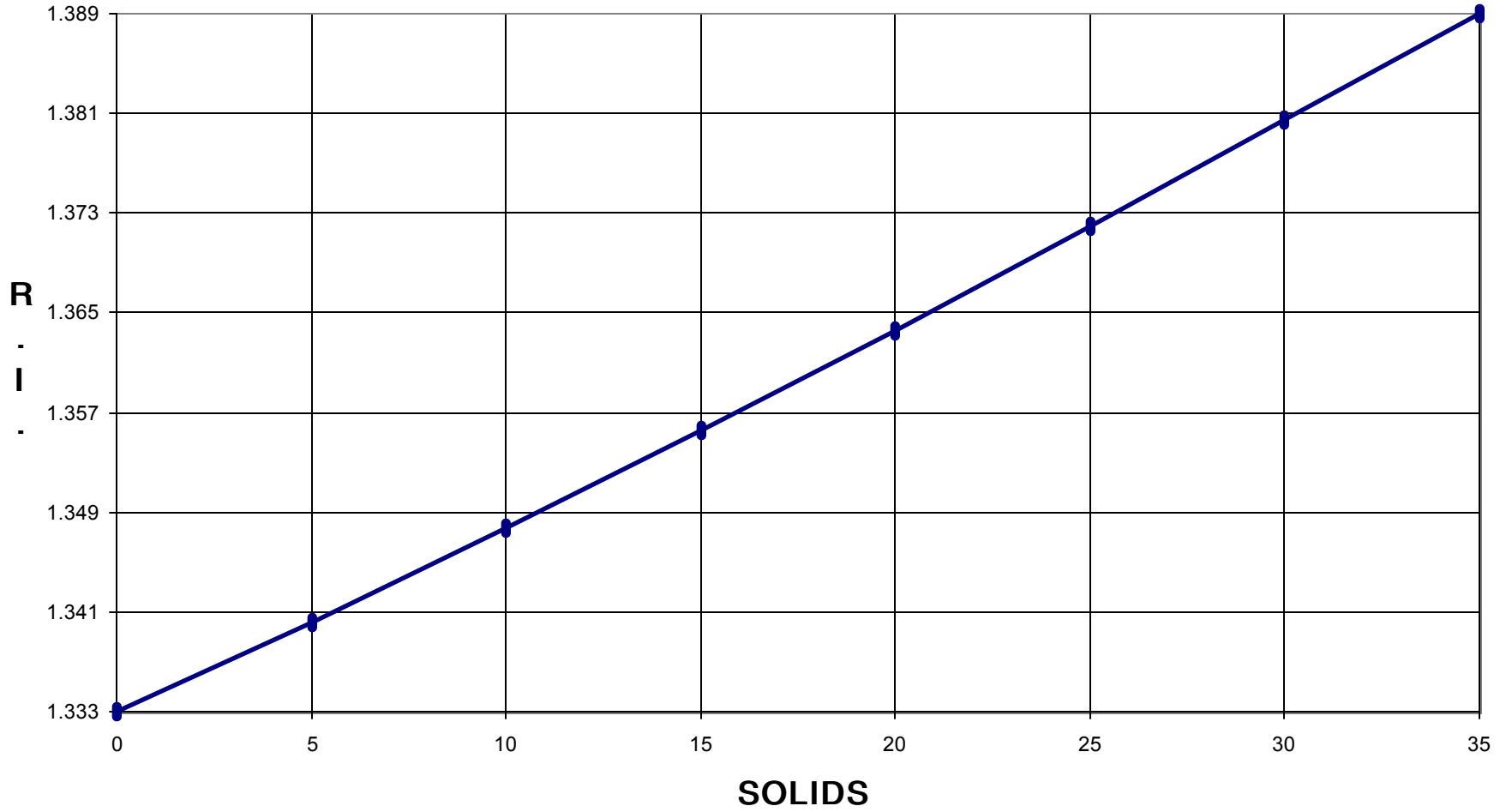
CUTTING OIL

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 4/2/97	0	1.333								
Test: T97-15E	2.5	1.3368								
Chem:	5	1.3401								
Instr:	7.5	1.3433								
	10	1.3468								



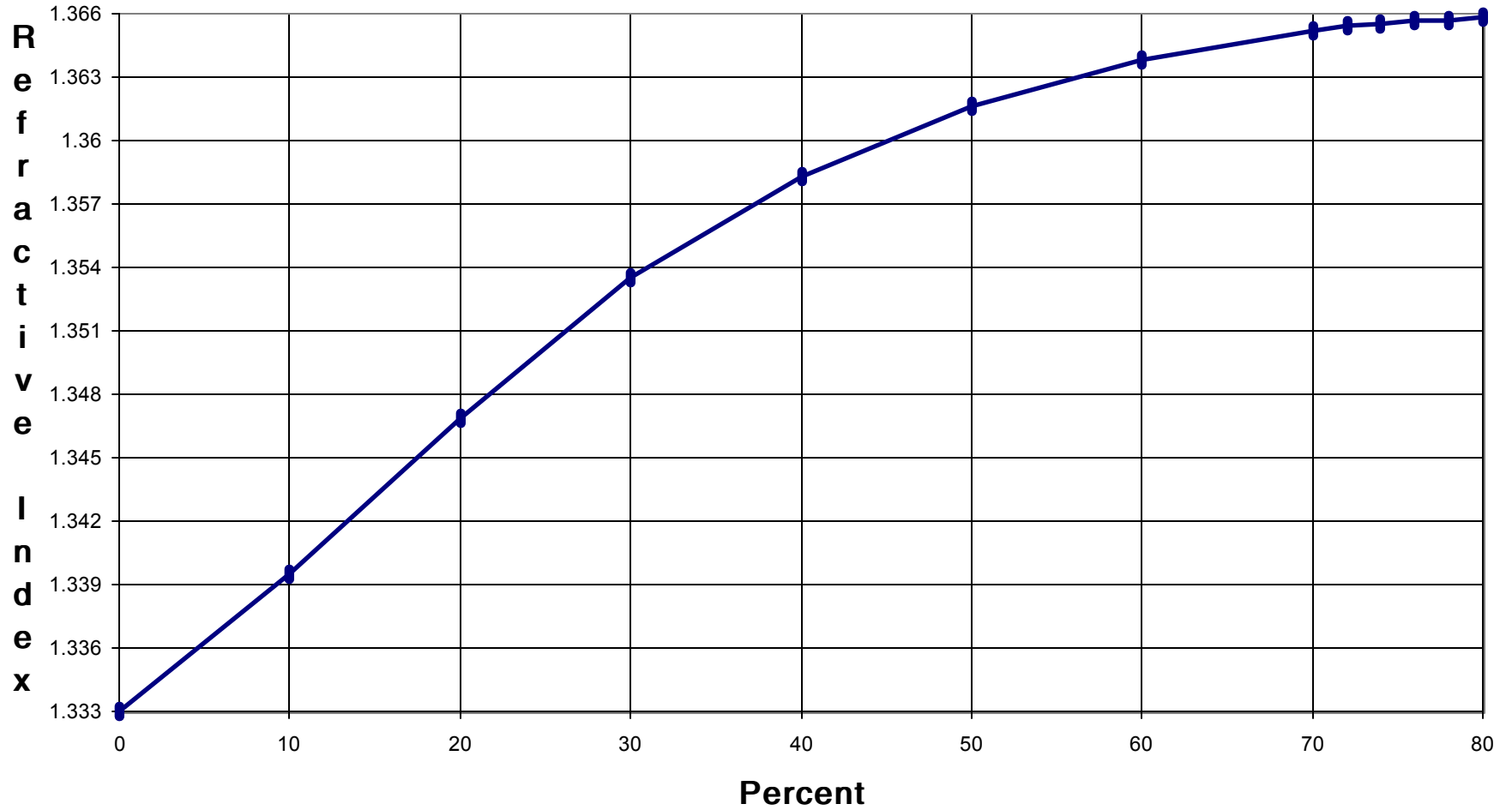
DEXTROSE

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 9/21/95	0	1.333	25	1.3719						
Test: T-100	5	1.3402	30	1.3805						
Chem: DEXTROSE	10	1.3477	35	1.38894						
Instr:	15	1.3555								
	20	1.3635								



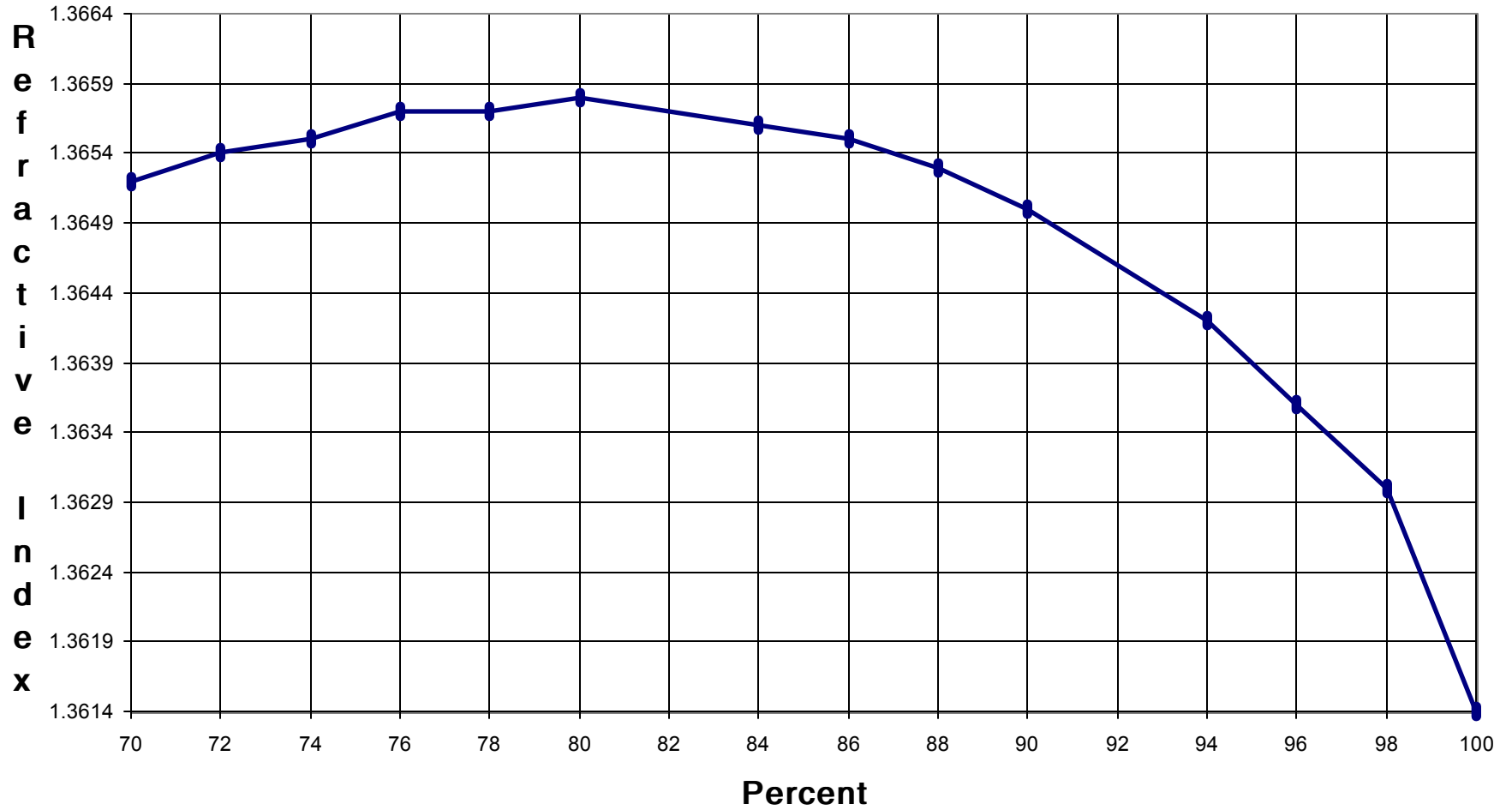
Ethanol

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 5/20/93	0	1.333	50	1.3616	76	1.3657				
Test: S-136A	10	1.3395	60	1.3638	78	1.3657				
Chem: CH ₃ CH ₂ OH	20	1.3469	70	1.3652	80	1.3658				
Instr: Refract	30	1.3535	72	1.3654						
	40	1.3583	74	1.3655						



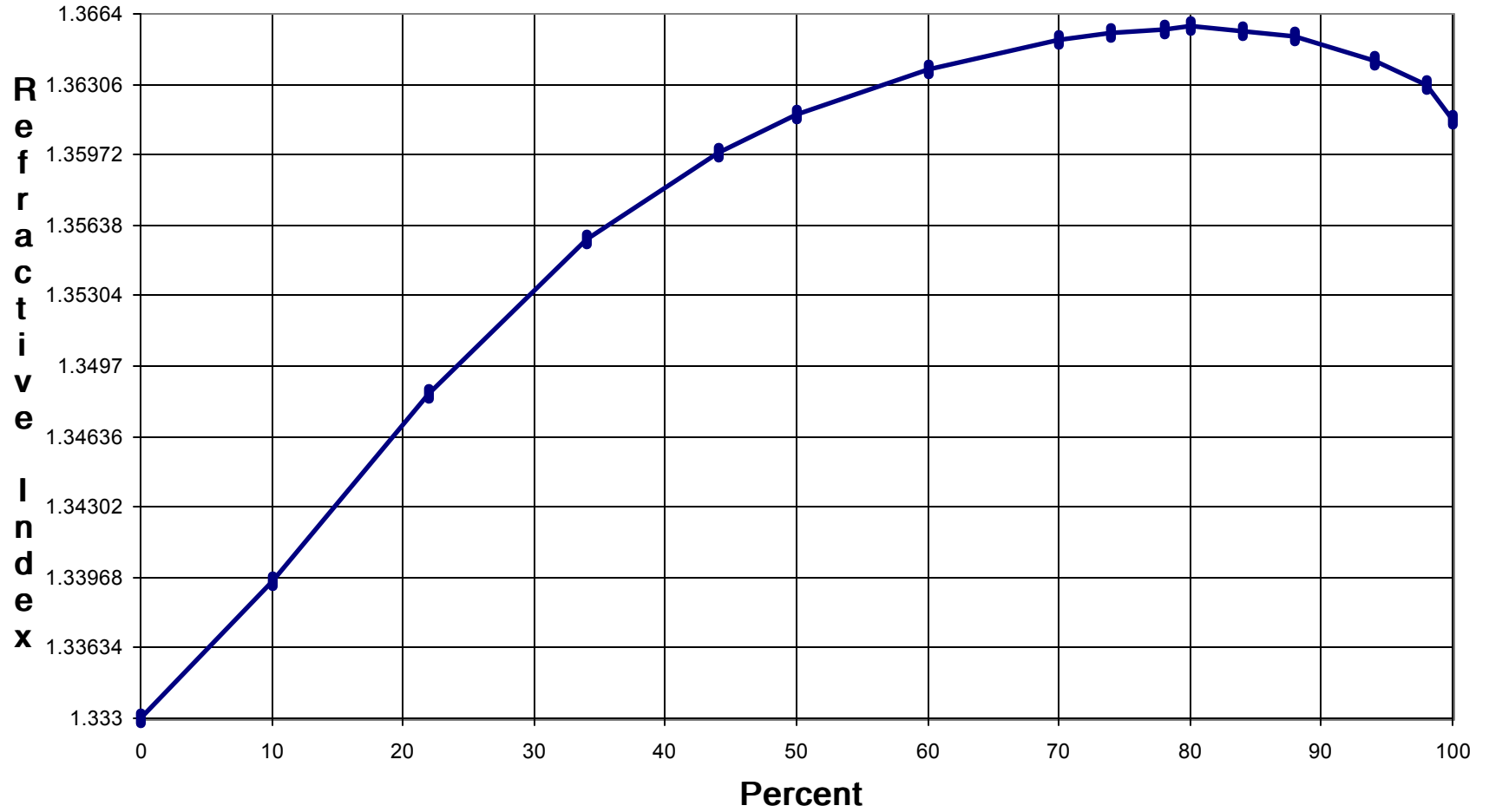
Ethanol

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 5/20/93	70	1.3652	80	1.3658	94	1.3642				
Test: S-136B	72	1.3654	84	1.3656	96	1.3636				
Chem:	74	1.3655	86	1.3655	98	1.363				
Instr: Refract	76	1.3657	88	1.3653	100	1.3614				
	78	1.3657	90	1.365						



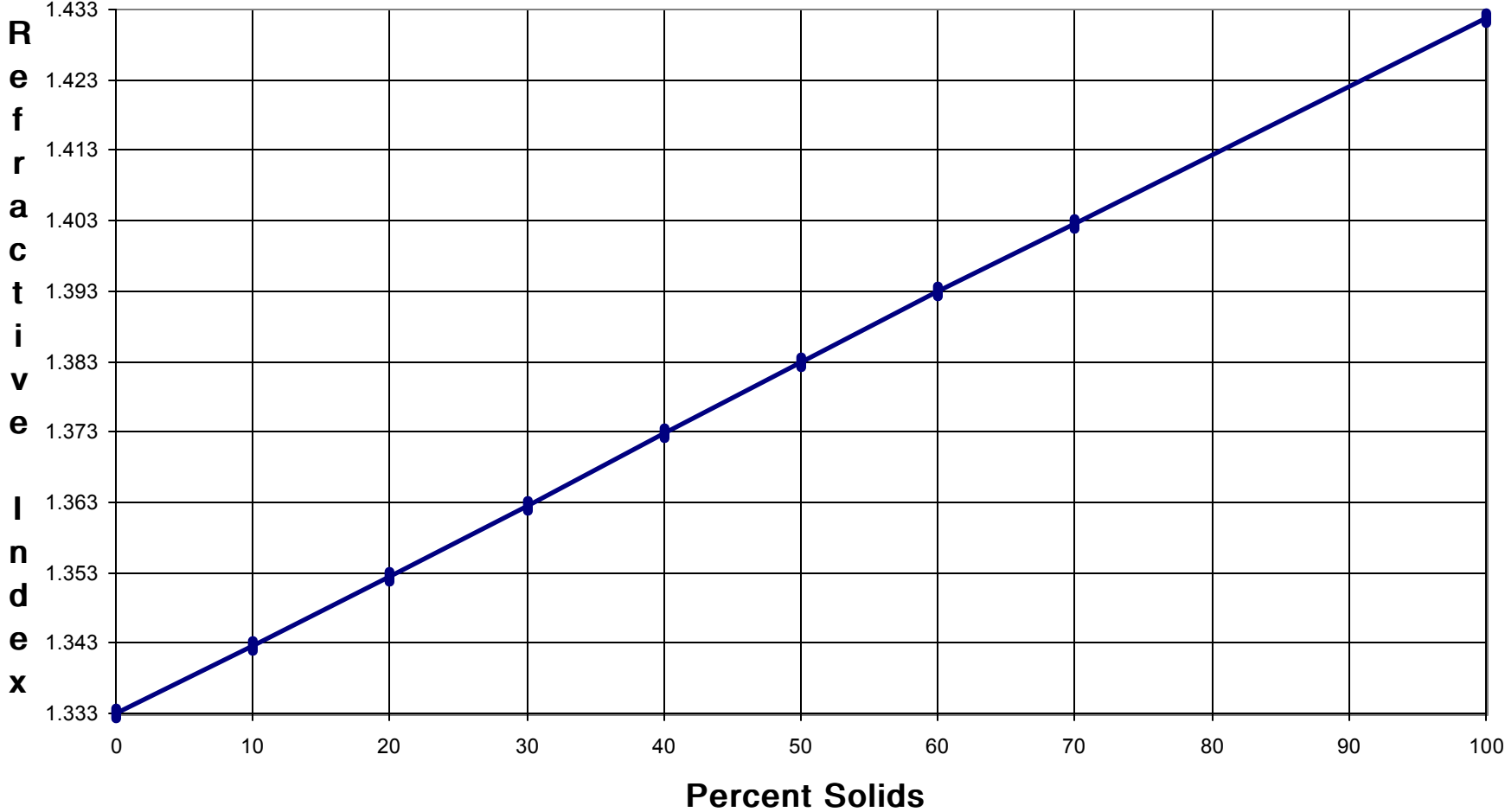
Ethanol 0-100

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 8/30/2000	0	1.333	50	1.3616	80	1.3658	100	1.3614		
Test: Ethanol	10	1.3395	60	1.3638	84	1.3656				
Chem:	22	1.3484	70	1.3652	88	1.3653				
Instr: CRC	34	1.3557	74	1.3655	94	1.3642				
	44	1.3598	78	1.3657	98	1.363				



Ethylene Glycol,0-100%

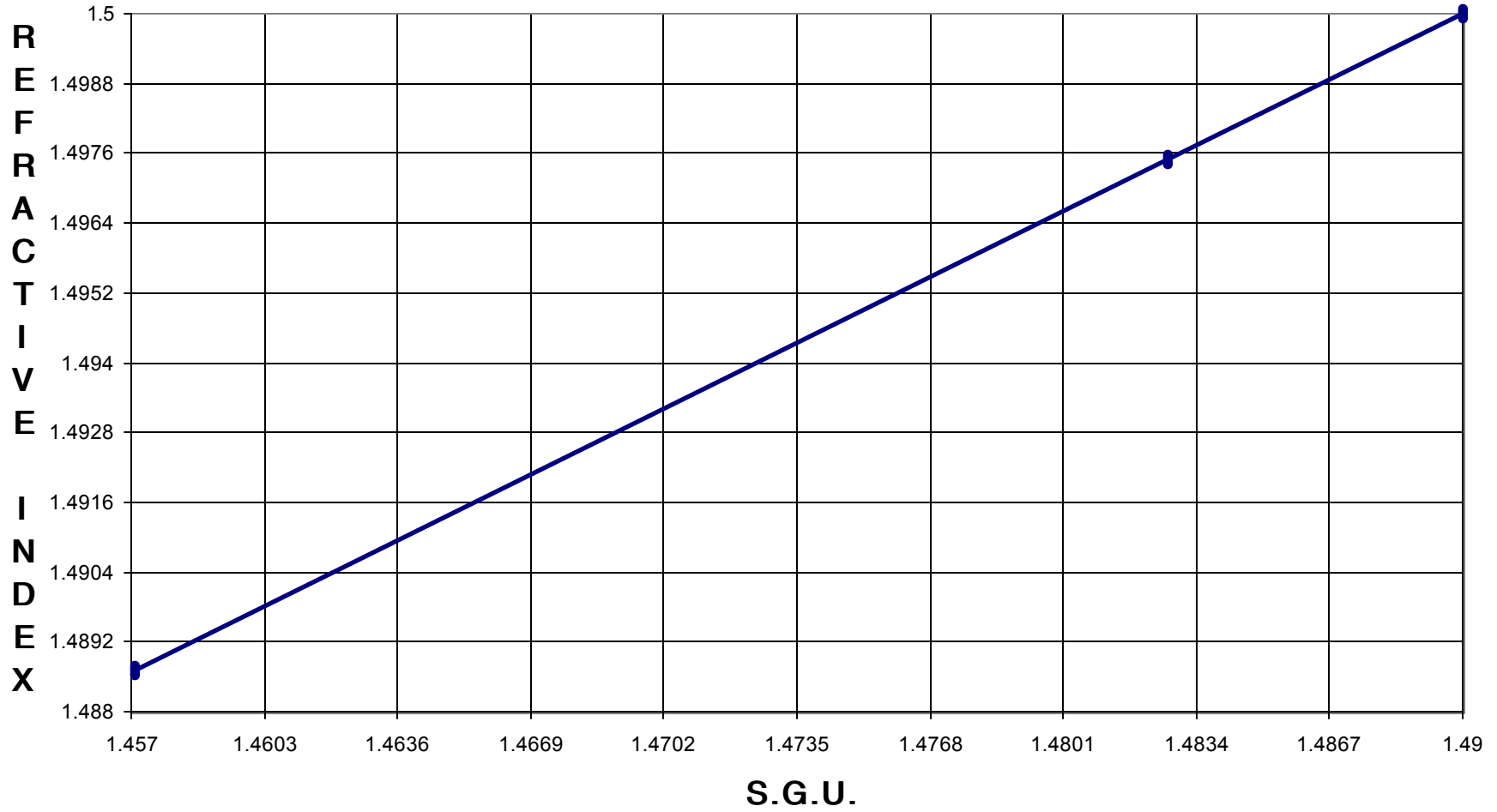
Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 12/10/90	0	1.333	50	1.383						
Test: S-105B	10	1.3425	60	1.393						
Chem:	20	1.3523	70	1.4026						
Instr: Refract	30	1.3625	100	1.4318						
	40	1.3728								



FERRIC CHLORIDE

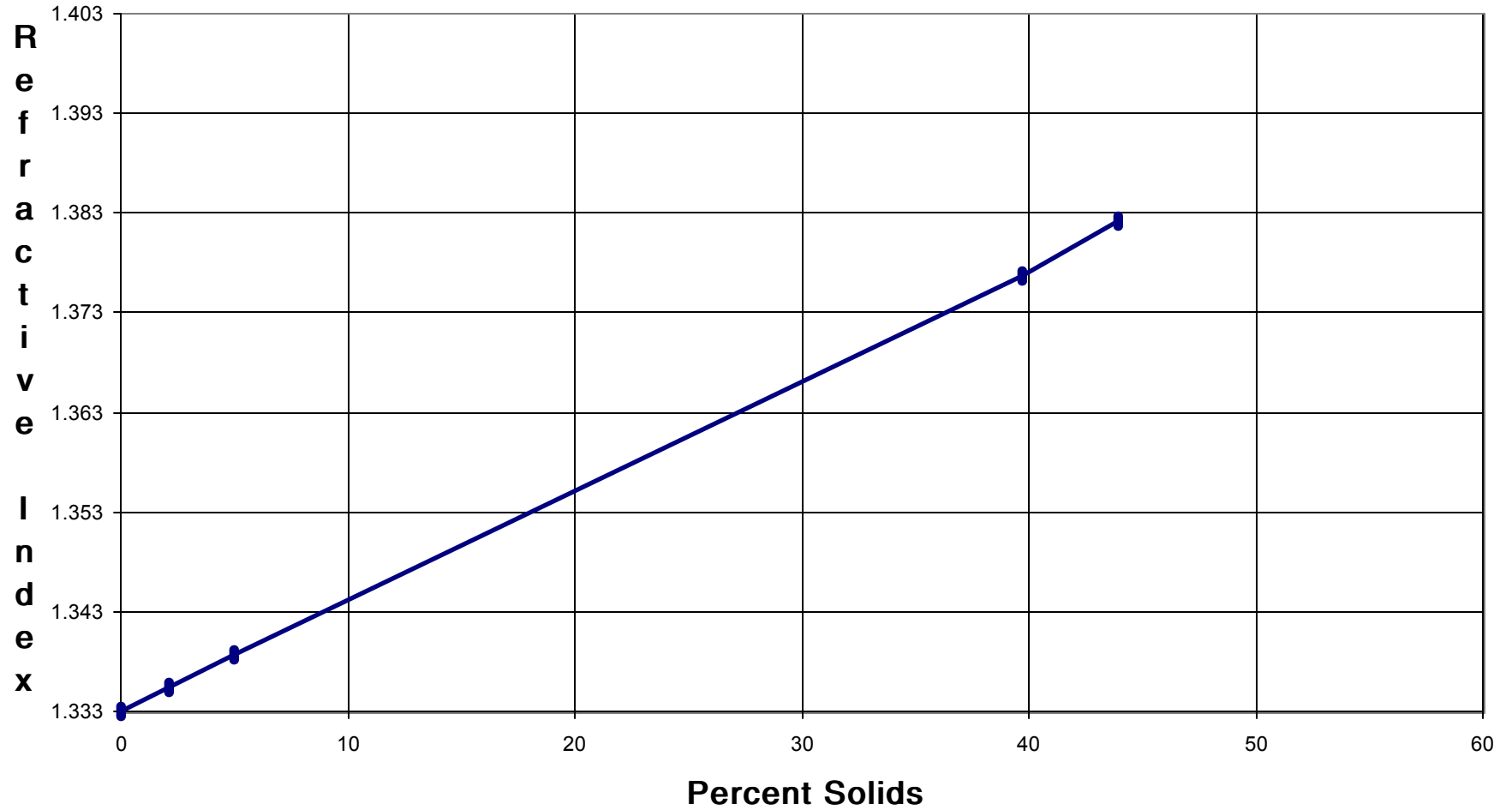
Electron Machine
Date: 2/10/99
Test: FERRIC
Chem:
Instr: MPR-ESCAN

X	Y	X	Y	X	Y	X	Y	X	Y
1.4571	1.4887								
1.4827	1.4975								
1.49	1.5								



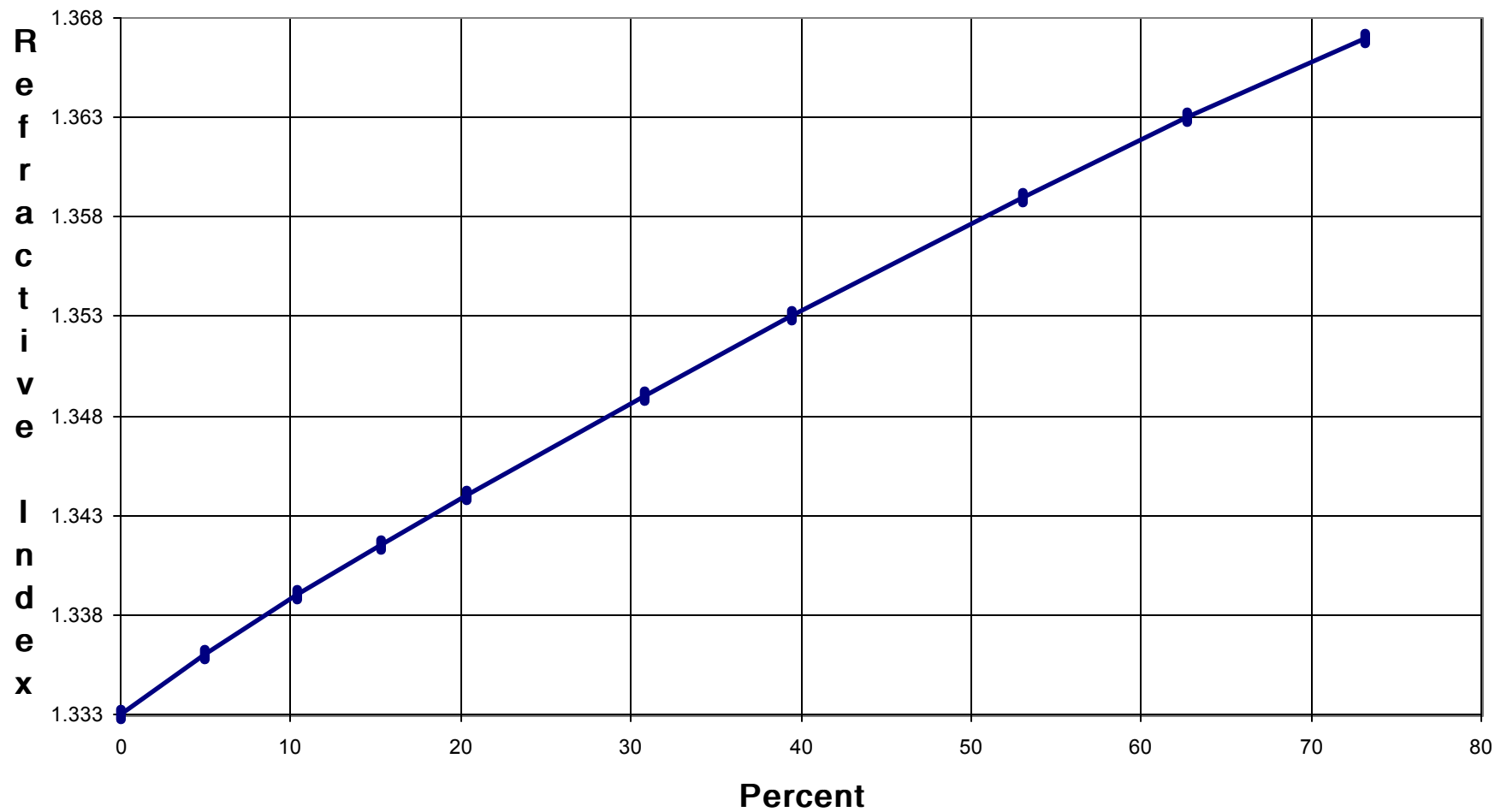
Formaldehyde

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 11/28/90	0	1.333								
Test: S-112	2.1	1.3354								
Chem:	5	1.3387								
Instr: MPR-83	39.7	1.3766								
	43.9	1.3822								



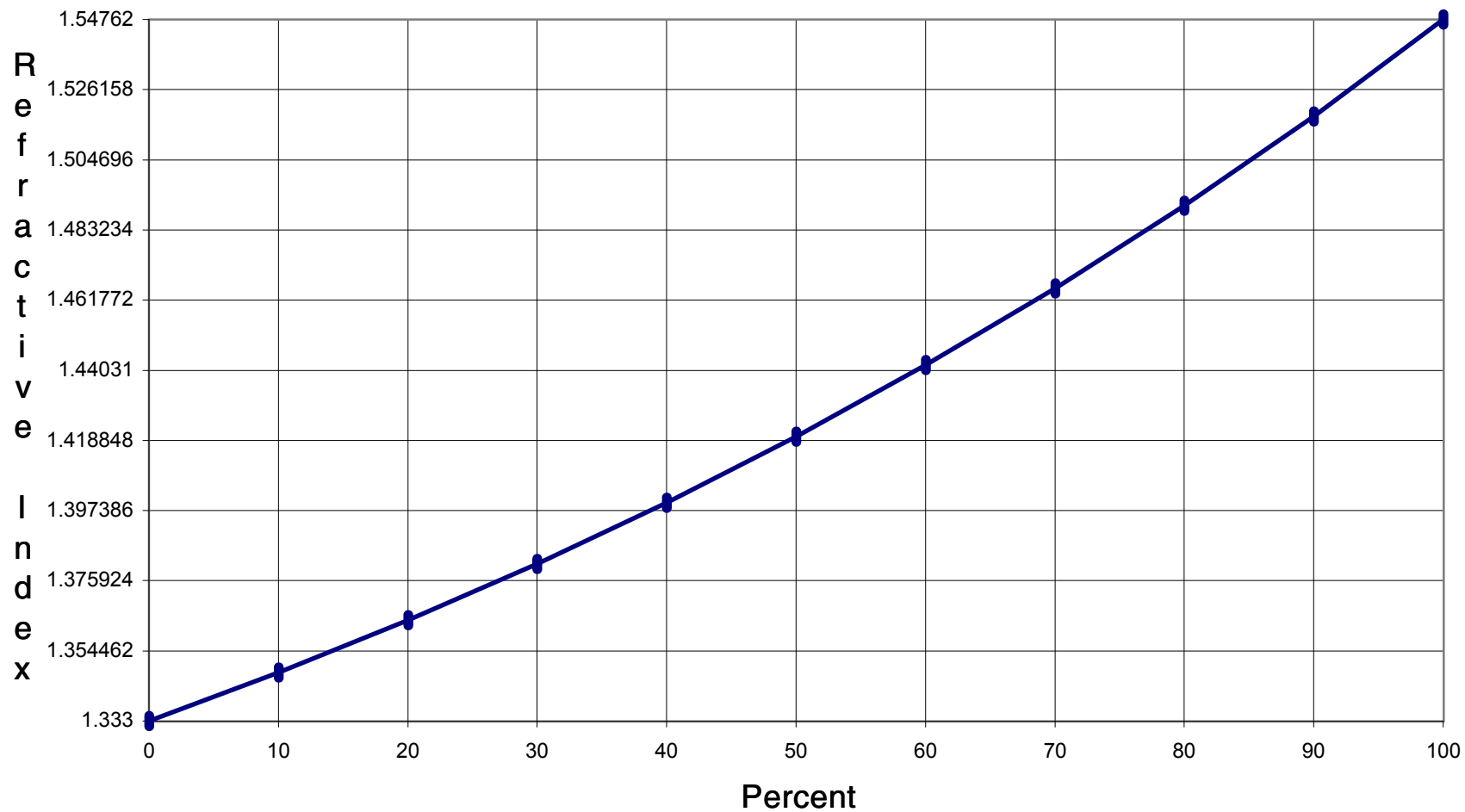
Formic Acid

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 8/9/91	0	1.333	30.81	1.349						
Test: S-122	4.9	1.336	39.46	1.353						
Chem: HCOOH	10.38	1.339	53.02	1.359						
Instr: Refract	15.25	1.3415	62.69	1.363						
	20.31	1.344	73.18	1.367						



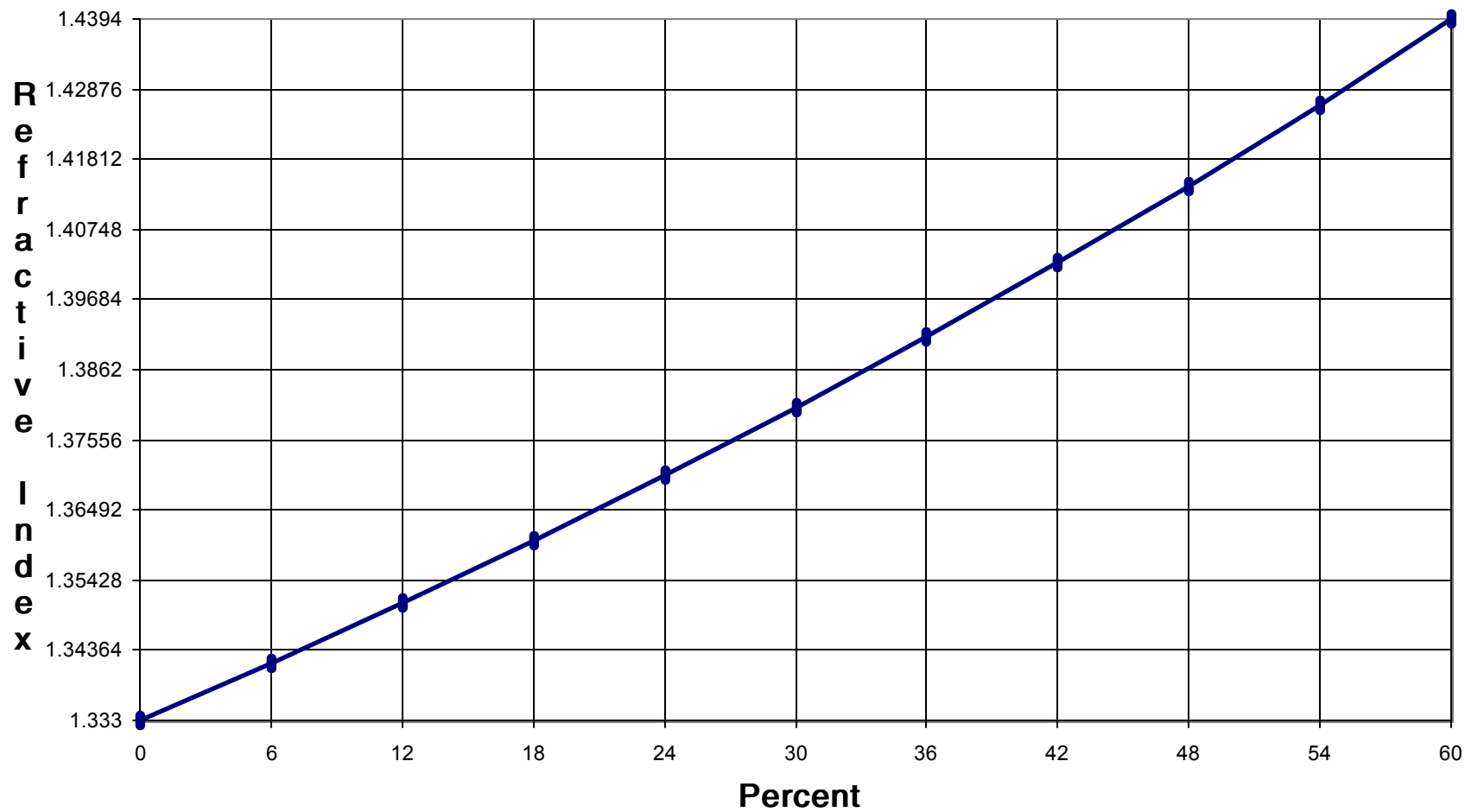
Fructose 0-100%

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 8/30/2000	0	1.333	50	1.42004	100	1.54762				
Test: FRUCTOSE	10	1.34782	60	1.44187						
Chem:	20	1.36382	70	1.46539						
Instr:	30	1.38111	80	1.49069						
	40	1.39982	90	1.51796						



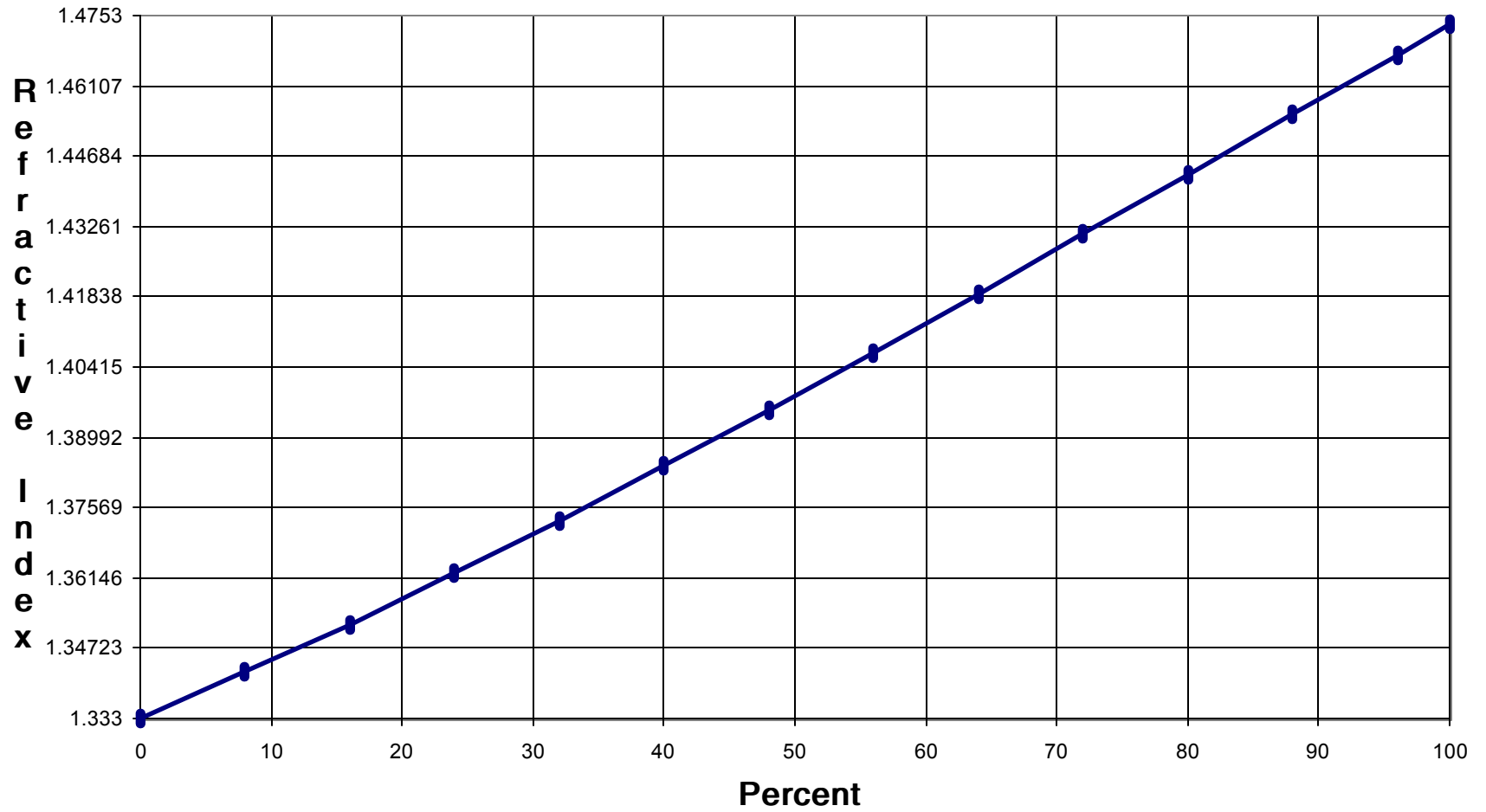
Glucose-D 0-60%

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 8/30/2000	0	1.333	30	1.3805	60	1.4394				
Test: GLUCOSE	6	1.3417	36	1.3912						
Chem:	12	1.3508	42	1.4024						
Instr: CRC	18	1.3603	48	1.4141						
	24	1.3702	54	1.4263						



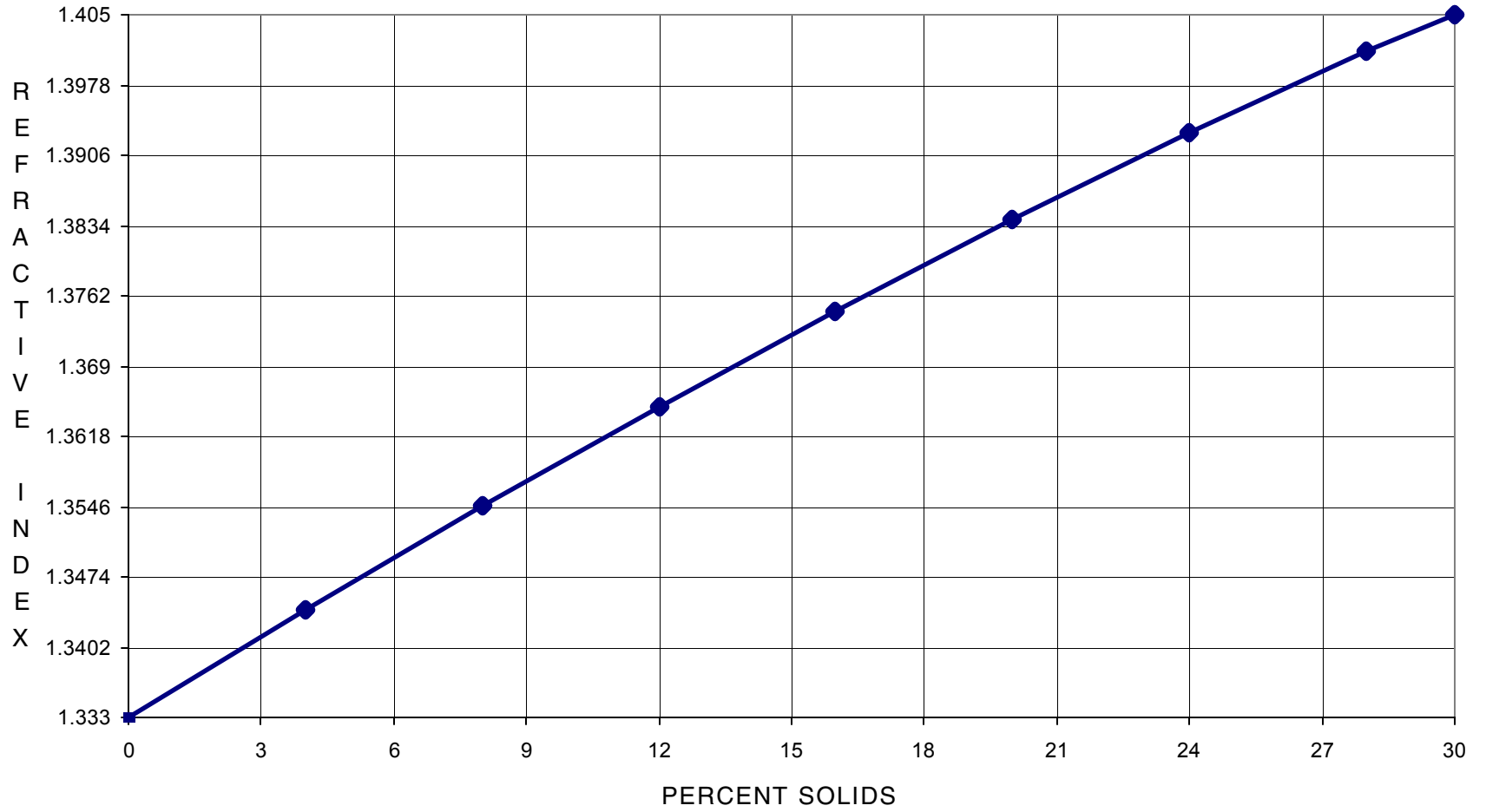
Glycerol 0-100%

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 8/30/2000	0	1.333	40	1.3841	80	1.4431				
Test: GLYCEROL	8	1.3424	48	1.3954	88	1.4553				
Chem:	16	1.3521	56	1.4069	96	1.4674				
Instr: CRC	24	1.3624	64	1.4189	100	1.4735				
	32	1.373	72	1.431						



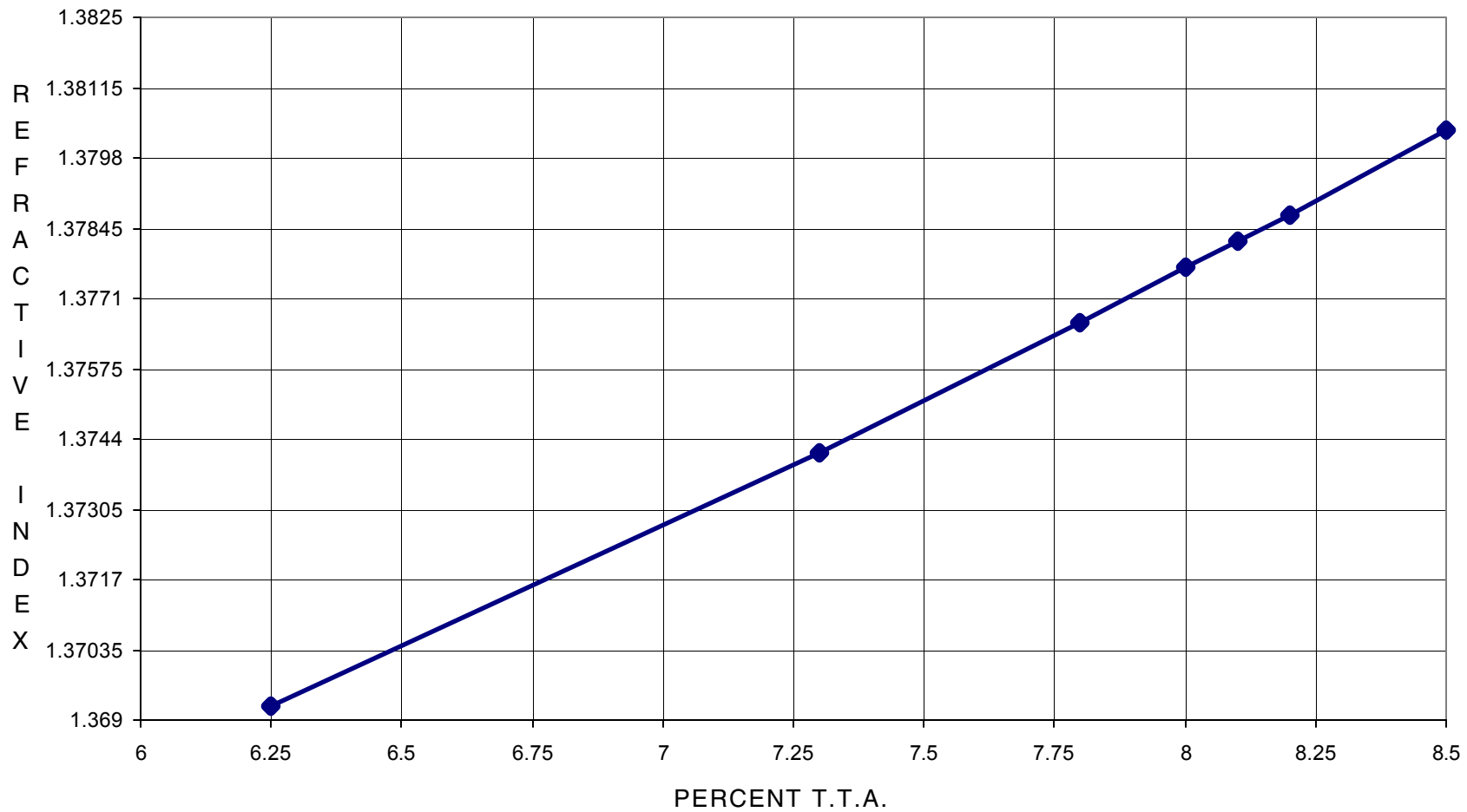
GREEN LIQUOR (0-30%)

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 11/6/2000	0	1.333	20	1.384						
Test: G.L. %	4	1.3441	24	1.3929						
Chem:	8	1.3546	28	1.4012						
Instr: CRC	12	1.3648	30	1.405						
	16	1.3746								



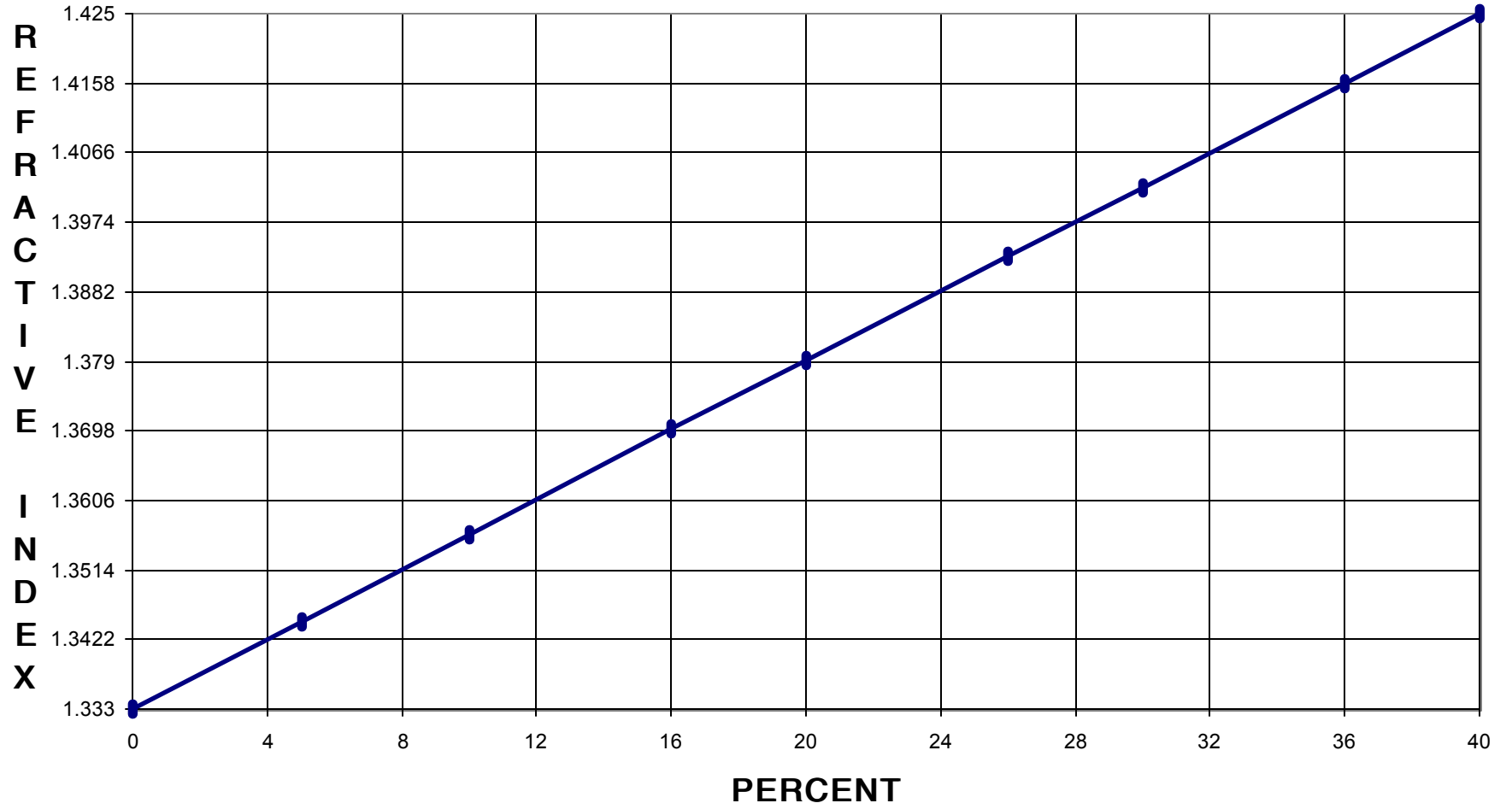
GREEN LIQUOR T.T.A.

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 10/20/2000	6.25	1.36925	8.2	1.3787						
Test: G.L. TTA	7.3	1.37412	8.5	1.38032						
Chem:	7.8	1.37663								
Instr: ABBE	8	1.37771								
	8.1	1.3782								



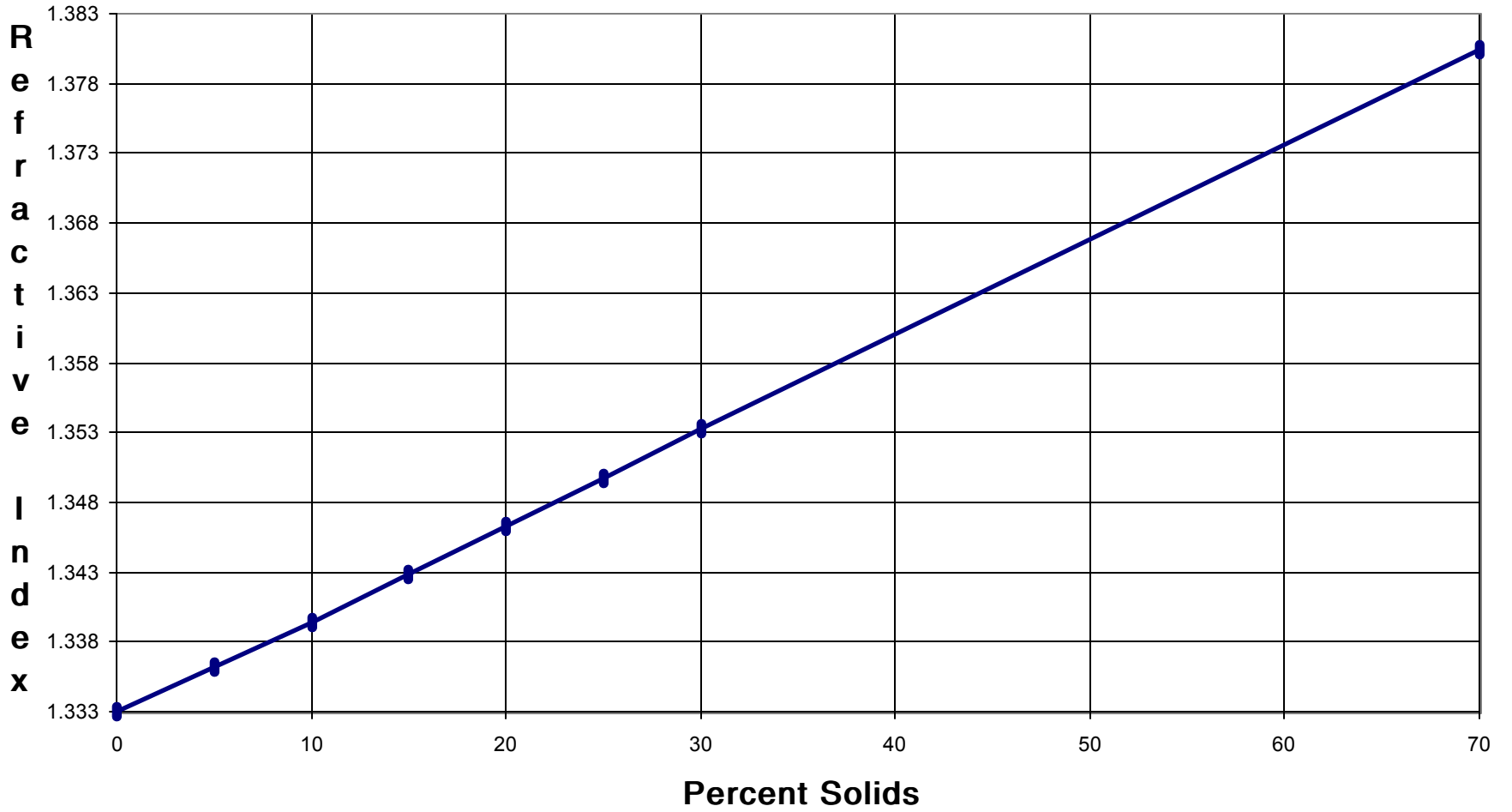
HYDROCHLORIC ACID (HCL)

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 8/25/99	0	1.333	26	1.393						
Test: HCL	5	1.3445	30	1.402						
Chem:	10	1.3561	36	1.4158						
Instr: C.R.C.	16	1.37	40	1.425						
	20	1.3792								



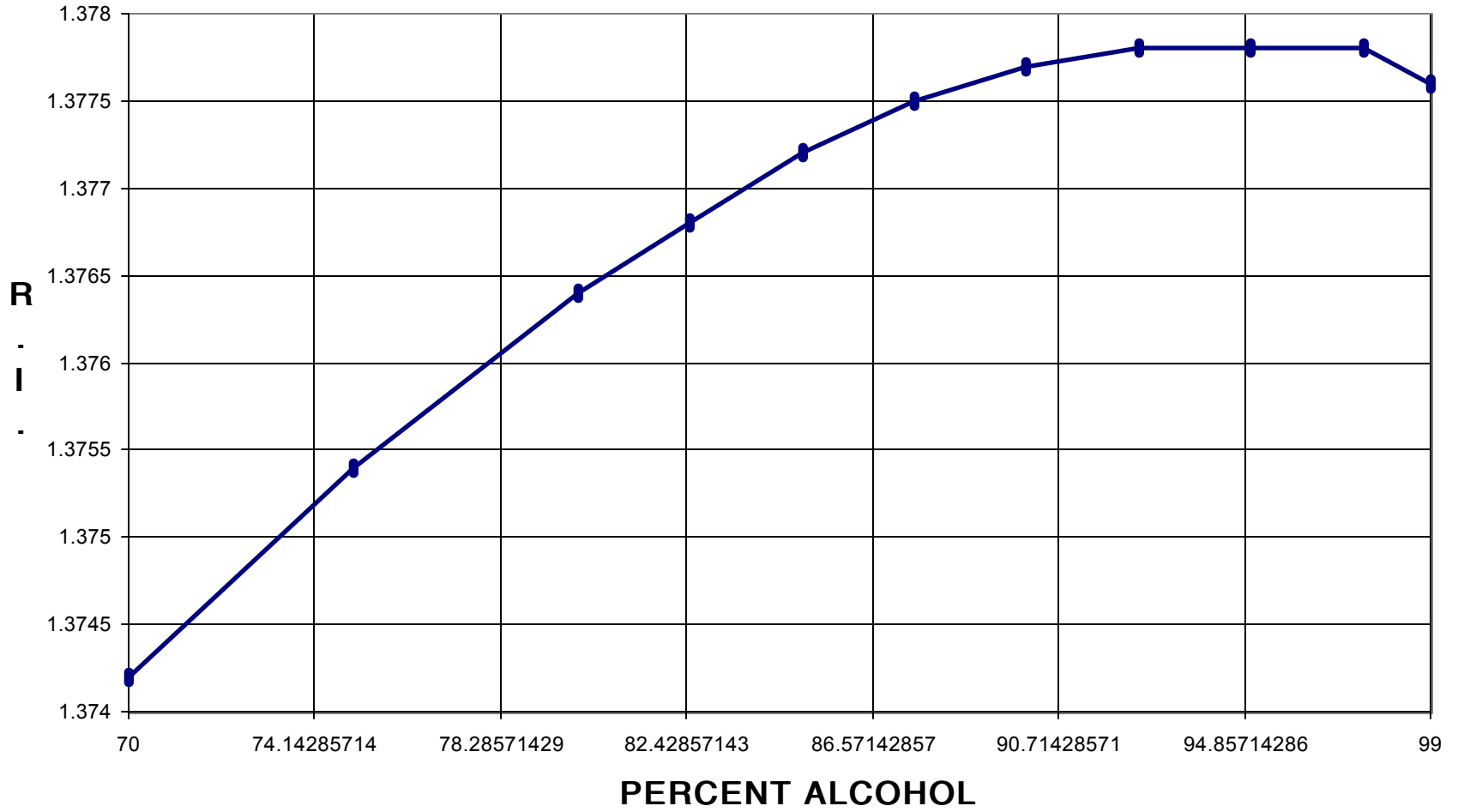
Hydrogen Peroxide

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 5/20/91	0	1.333	25	1.34969						
Test: S-119	5	1.33622	30	1.35332						
Chem:	10	1.33944	70	1.3804						
Instr: Refract	15	1.34284								
	20	1.34622								



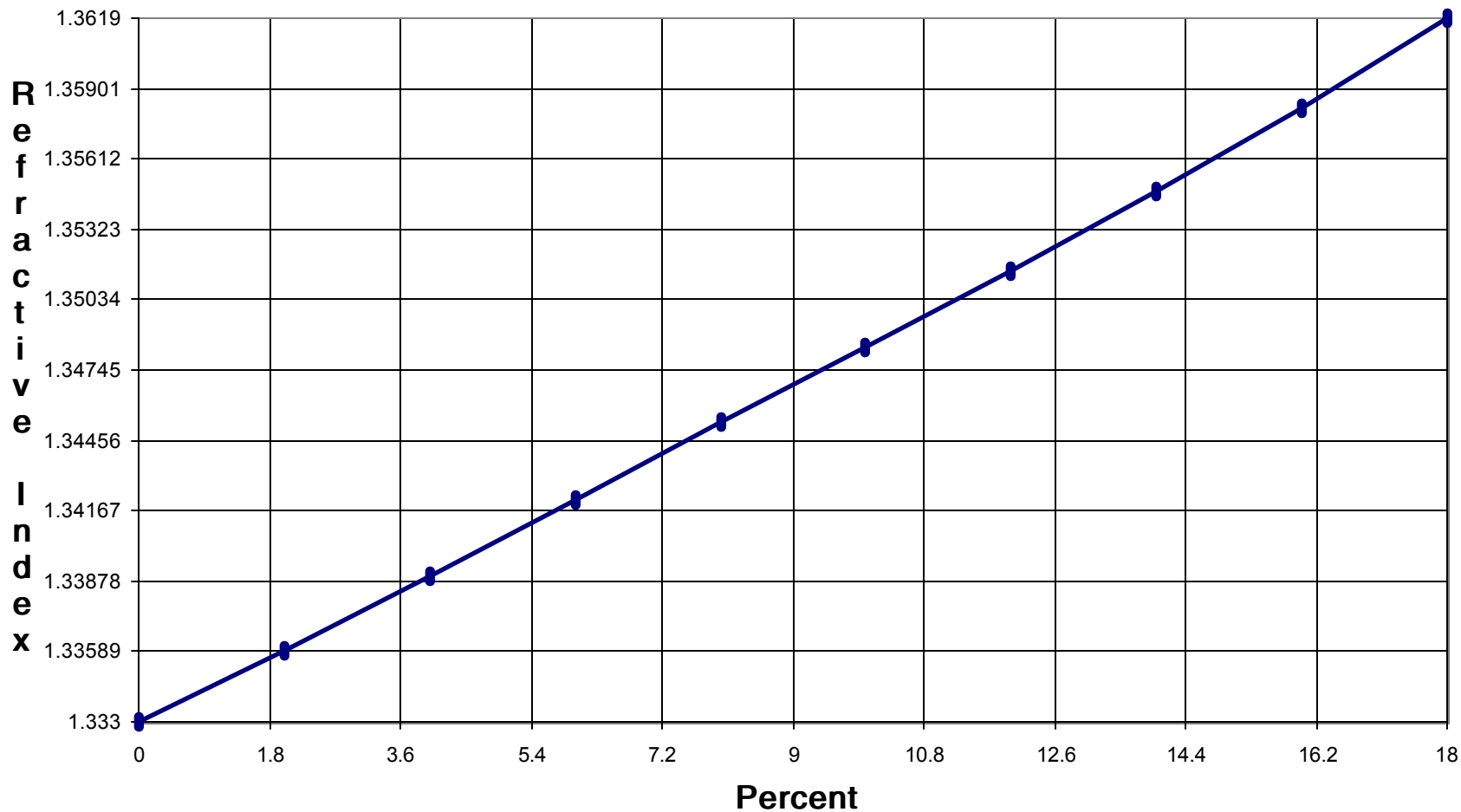
ISOPROPYL ALCOHOL

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 1/13/94	70	1.3742	87.5	1.3775	99	1.3776				
Test: T-94-03	75	1.3754	90	1.3777						
Chem: ALCOHOL	80	1.3764	92.5	1.3778						
Instr: MPR-83C WIDE	82.5	1.3768	95	1.3778						
	85	1.3772	97.5	1.3778						



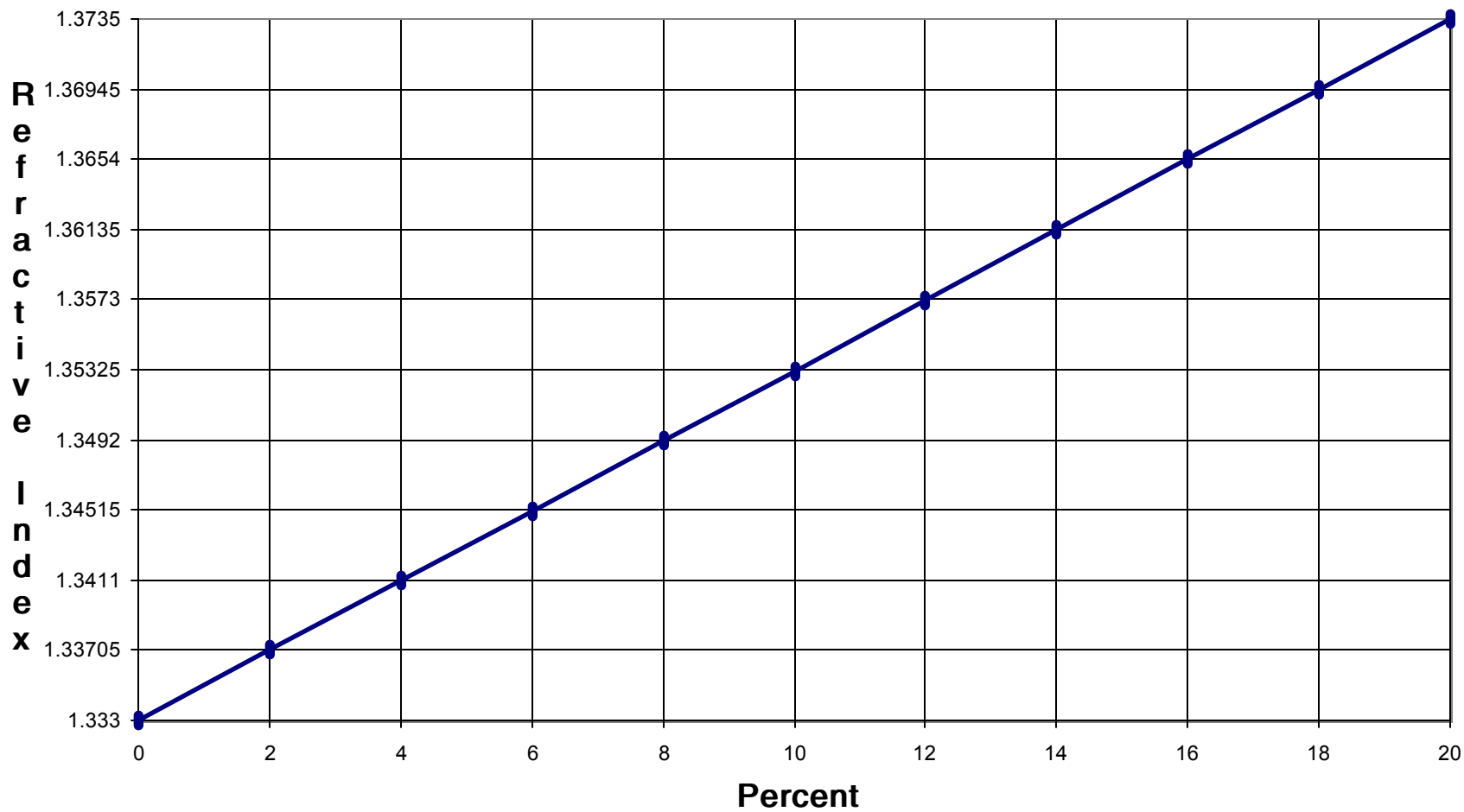
Lactose 0-18%

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 8/30/2000	0	1.333	10	1.3484						
Test: LACTOSE	2	1.3359	12	1.3515						
Chem:	4	1.339	14	1.3548						
Instr: CRC	6	1.3421	16	1.3582						
	8	1.3453	18	1.3619						



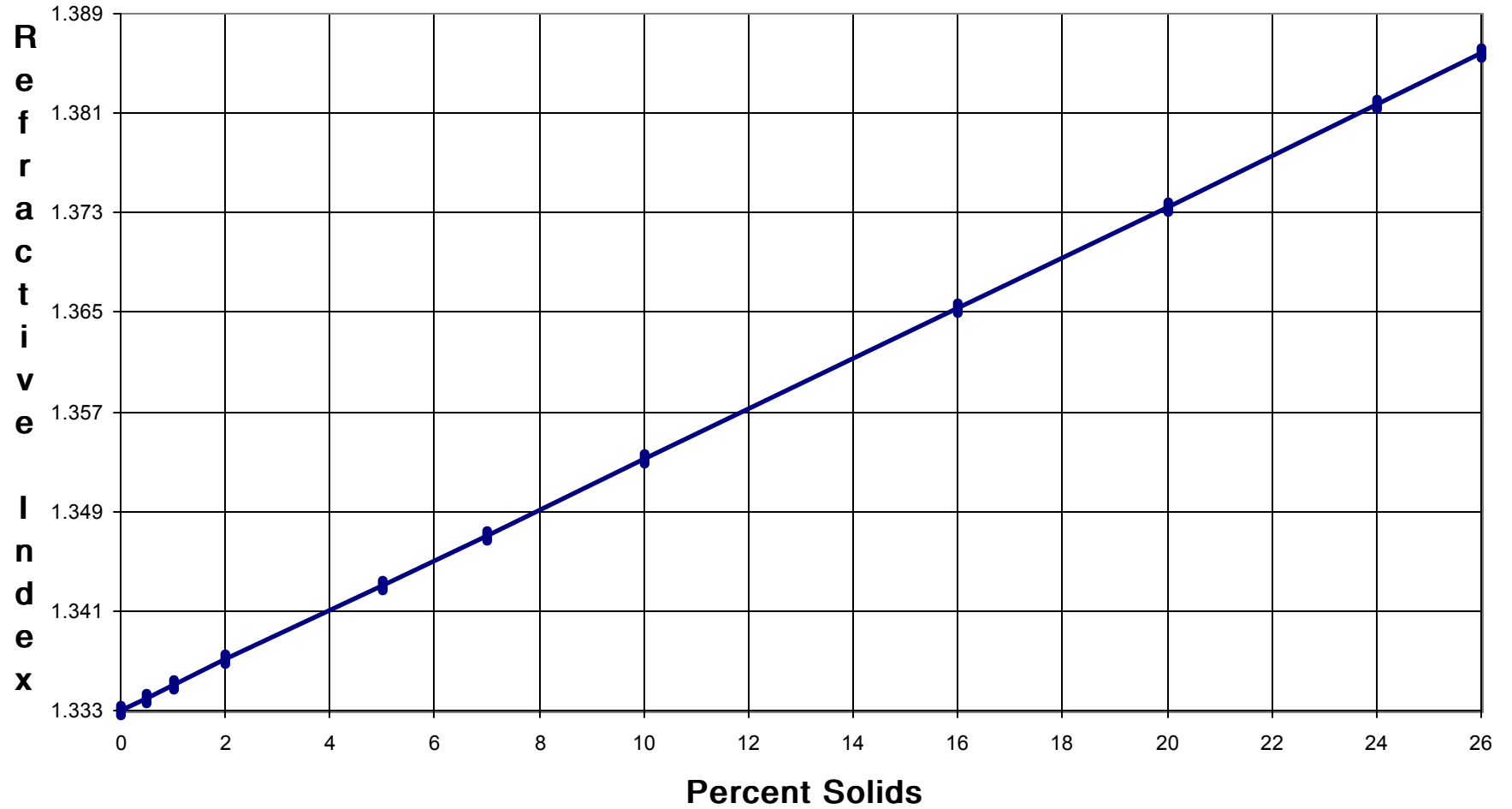
Magnesium Sulfate

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 8/30/2000	0	1.333	10	1.3532	20	1.3735				
Test: MAGNSM SUL	2	1.3371	12	1.3572						
Chem:	4	1.3411	14	1.3613						
Instr: CRC	6	1.3451	16	1.3654						
	8	1.3492	18	1.3694						



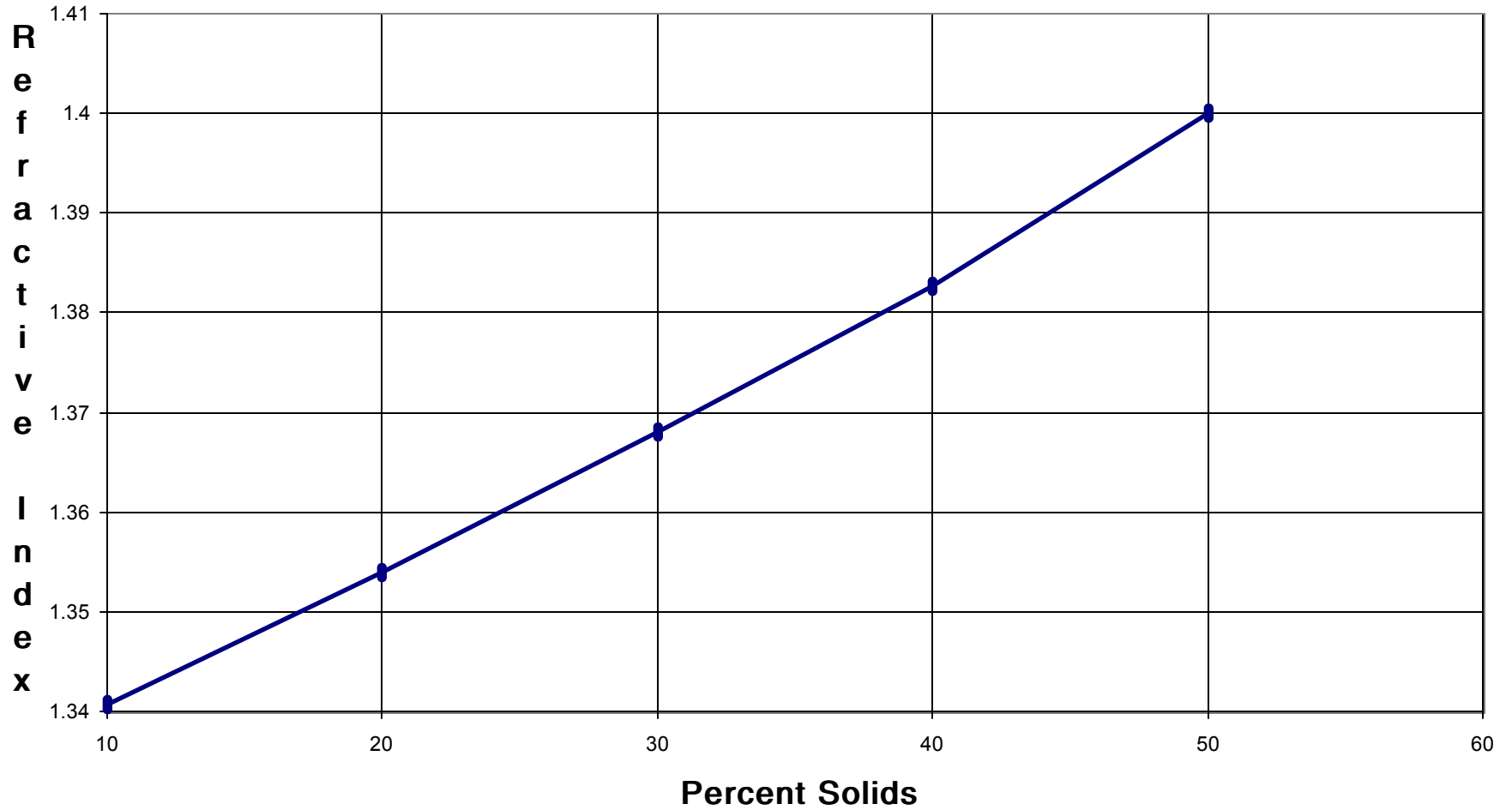
Magnesium Sulfate

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 11/12/91	0	1.333	7	1.3471	26	1.3858				
Test: S-126	0.5	1.334	10	1.3532						
Chem:	1	1.335	16	1.3654						
Instr: Refract.	2	1.3371	20	1.3735						
	5	1.3431	24	1.3817						



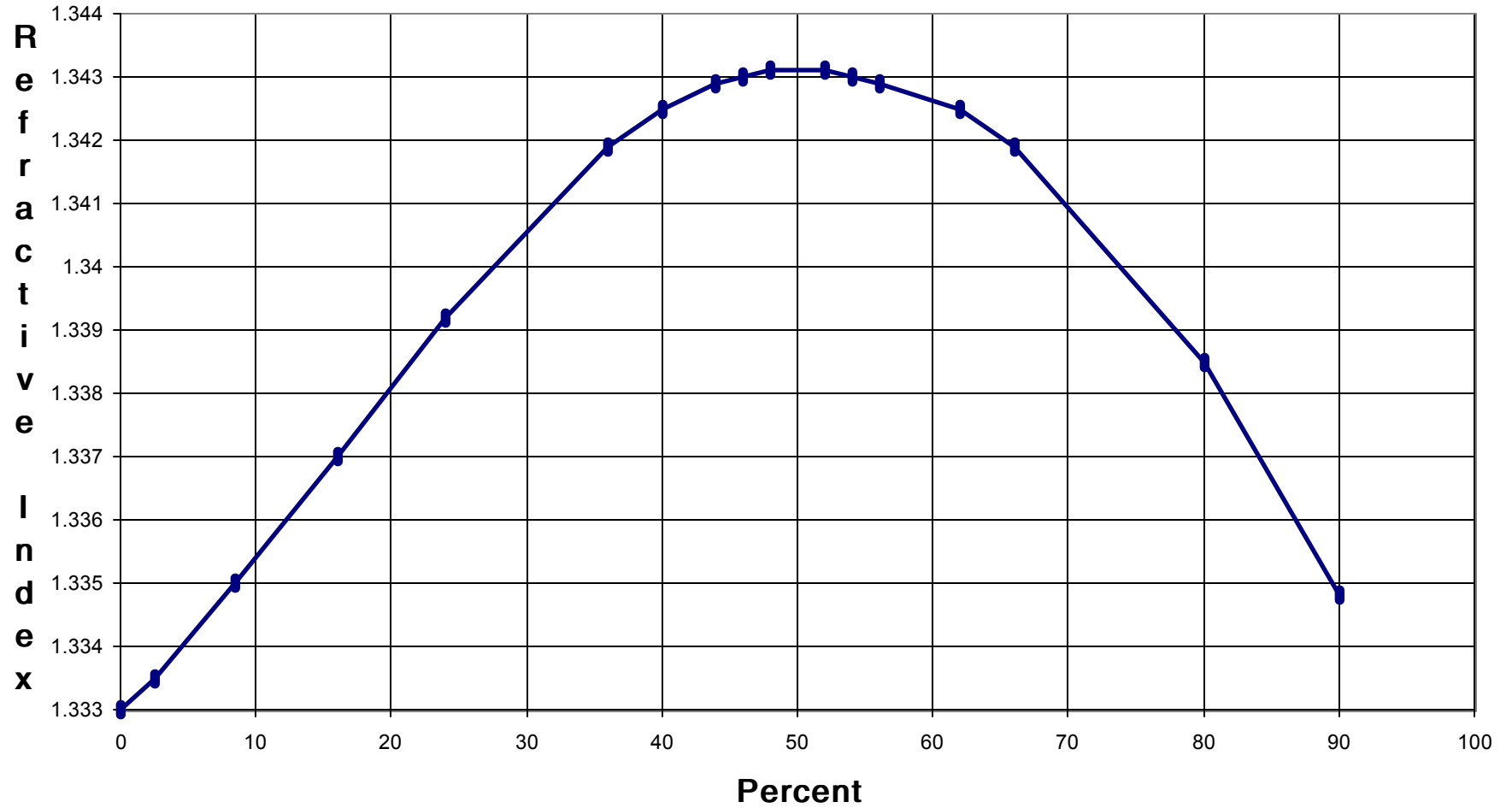
Maleic Acid

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 11/5/92	10	1.3407								
Test: T-264	20	1.354								
Chem:	30	1.368								
Instr: Refract	40	1.3827								
	50	1.4001								



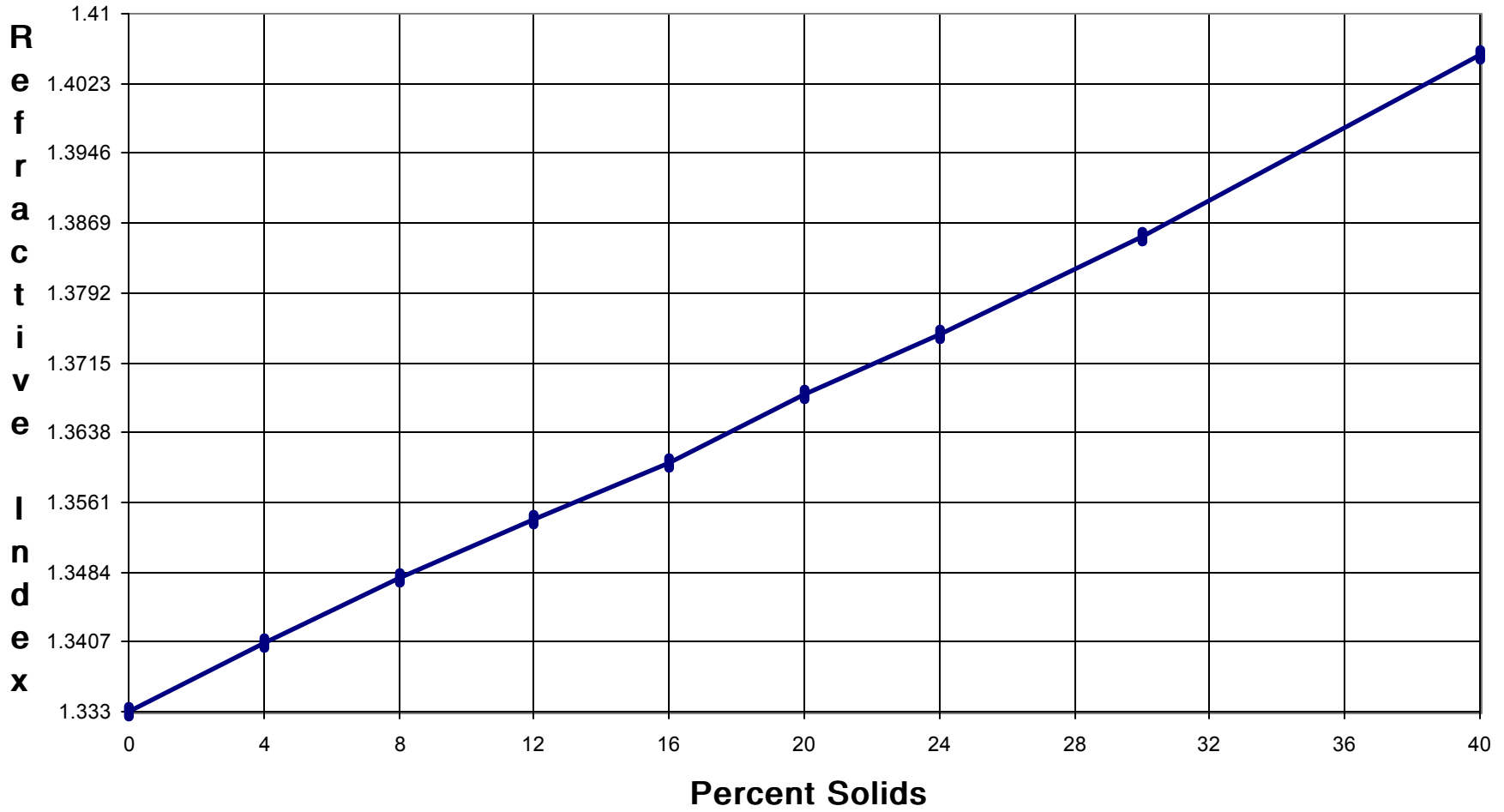
Methanol

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 4/10/92	0	1.333	36	1.3419	52	1.3431	80	1.3385		
Test: S-125	2.5	1.3335	40	1.3425	54	1.343	90	1.3348		
Chem: CH3OH	8.5	1.335	44	1.3429	56	1.3429				
Instr: Refract	16	1.337	46	1.343	62	1.3425				
	24	1.3392	48	1.3431	66	1.3419				



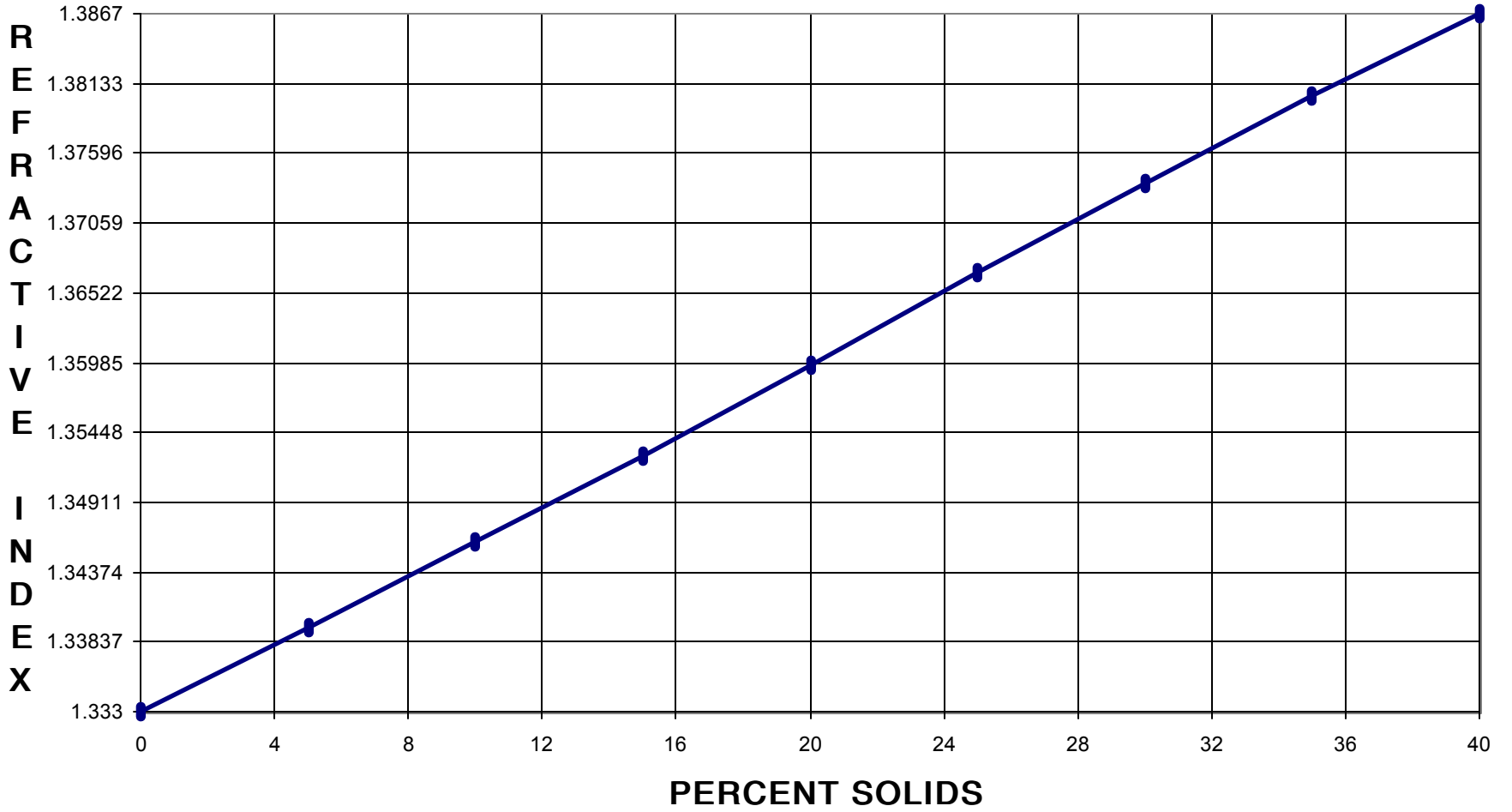
Monosodium Glutamate

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 8/9/90	0	1.333	20	1.368						
Test: S-106A	4	1.3405	24	1.3746						
Chem: MSG	8	1.3478	30	1.3854						
Instr: MPR-83	12	1.3542	40	1.4054						
	16	1.3604								



NITRIC ACID

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 7/1/98	0	1.333	25	1.3668						
Test: NITRIC A	5	1.3394	30	1.3736						
Chem:	10	1.346	35	1.3804						
Instr: CRC	15	1.3527	40	1.3867						
	20	1.3596								



Nitric Acid

Electron Machine
Date: 5/8/91
Test: S-102
Chem: HNO3
Instr: Abbe

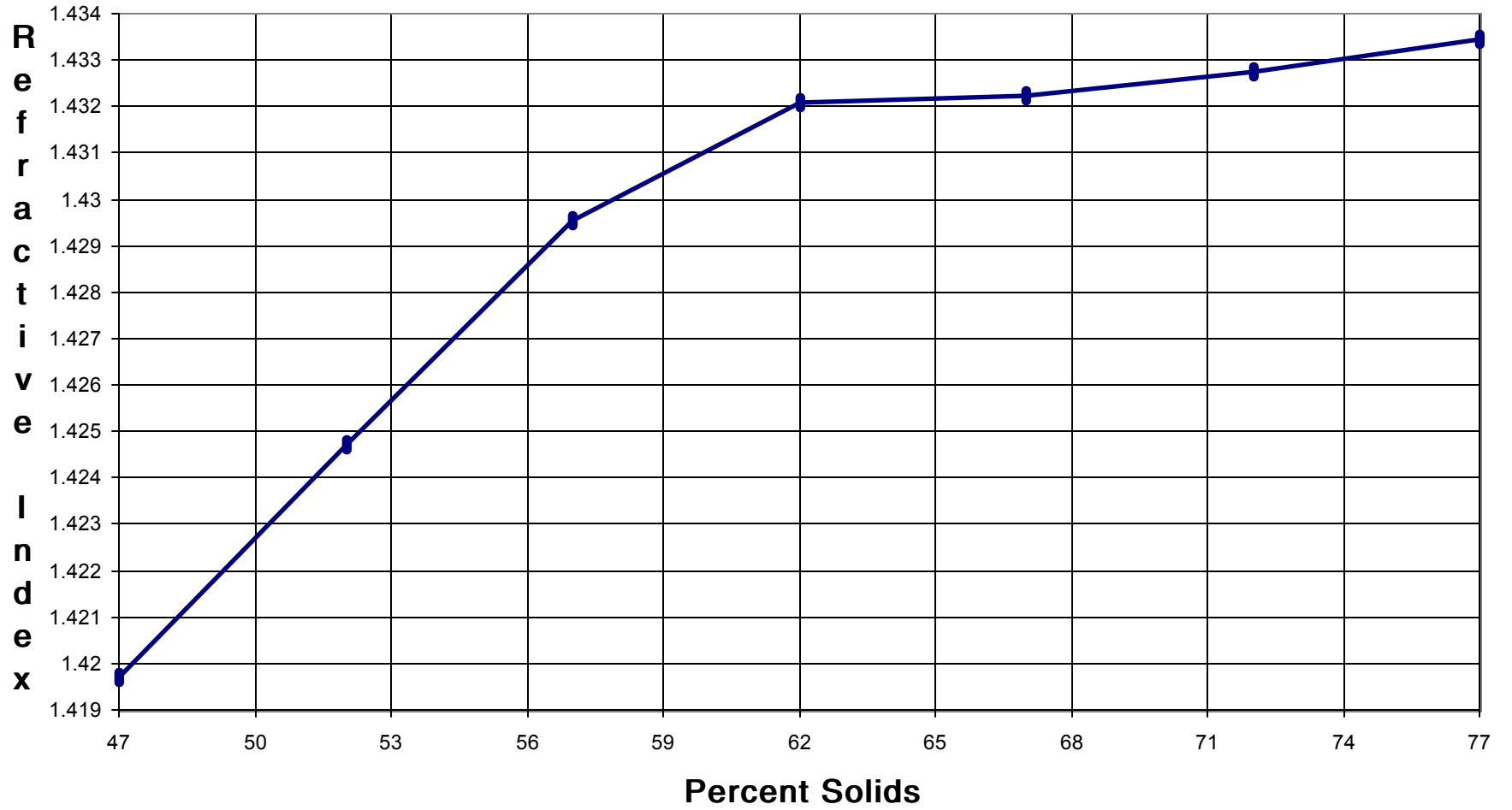
X	Y	X	Y	X	Y	X	Y	X	Y
0	1.333	3.95	1.338	10.78	1.347				
0.4	1.3335	5.51	1.34						
0.79	1.334	7.04	1.342						
1.58	1.335	8.55	1.344						
2.37	1.336	10.04	1.346						



Nylon Salts

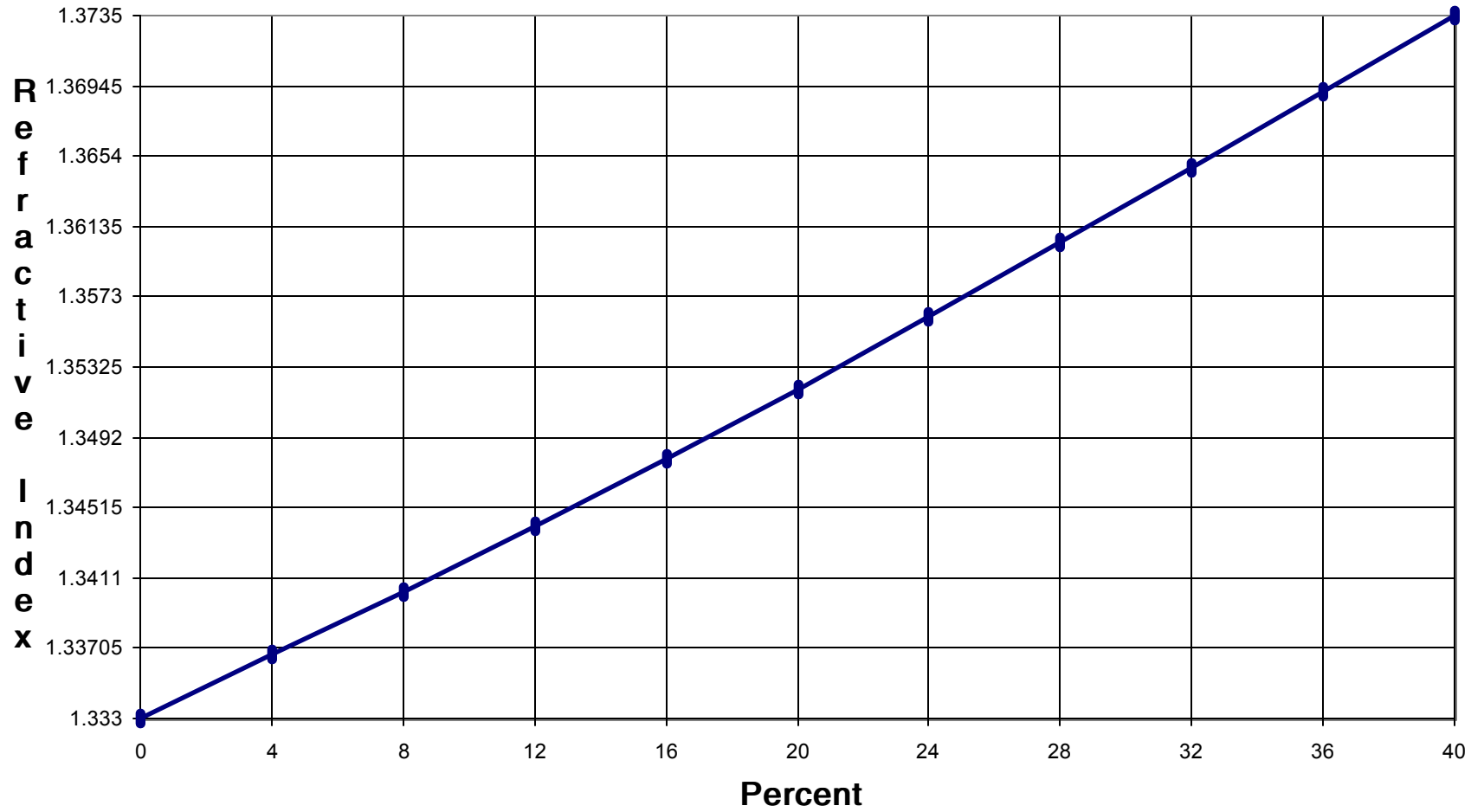
Electron Machine
Date: 7/27/93
Test: S-137A
Chem:
Instr: Refract

X	Y	X	Y	X	Y	X	Y	X	Y
47	1.41969	72	1.43276						
52	1.42473	77	1.43345						
57	1.42955								
62	1.43207								
67	1.43224								



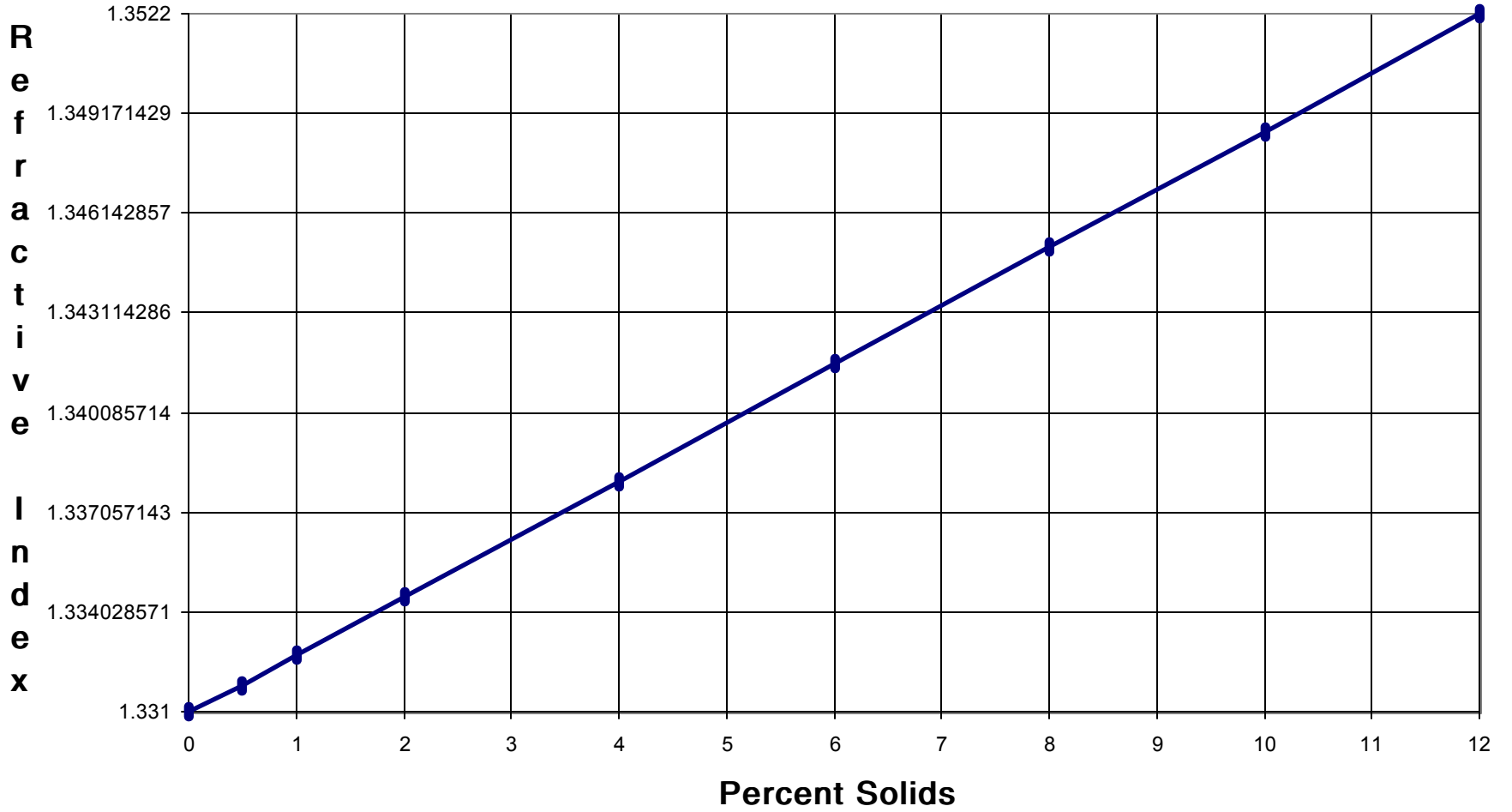
Phosphoric Acid

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 8/30/2000	0	1.333	20	1.352	40	1.3735				
Test: PHOSPHORIC	4	1.3367	24	1.3561						
Chem:	8	1.3403	28	1.3604						
Instr: CRC	12	1.3441	32	1.3647						
	16	1.348	36	1.3691						



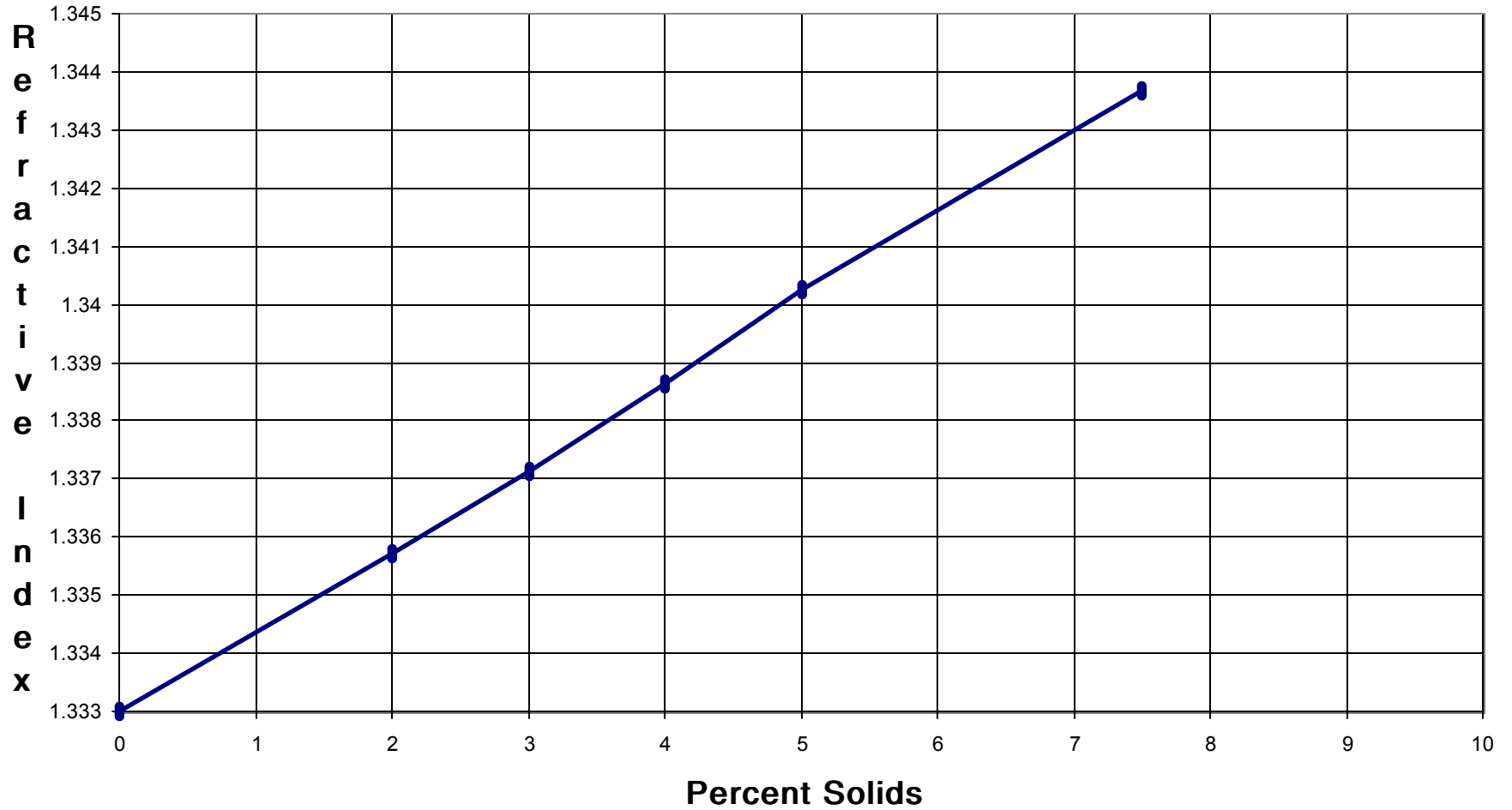
Polyvinyl Alcohol

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 12/4/90	0	1.331	6	1.3416						
Test: S-114	0.5	1.3318	8	1.3451						
Chem: PVA	1	1.3327	10	1.3486						
Instr: Refract	2	1.3345	12	1.3522						
	4	1.338								



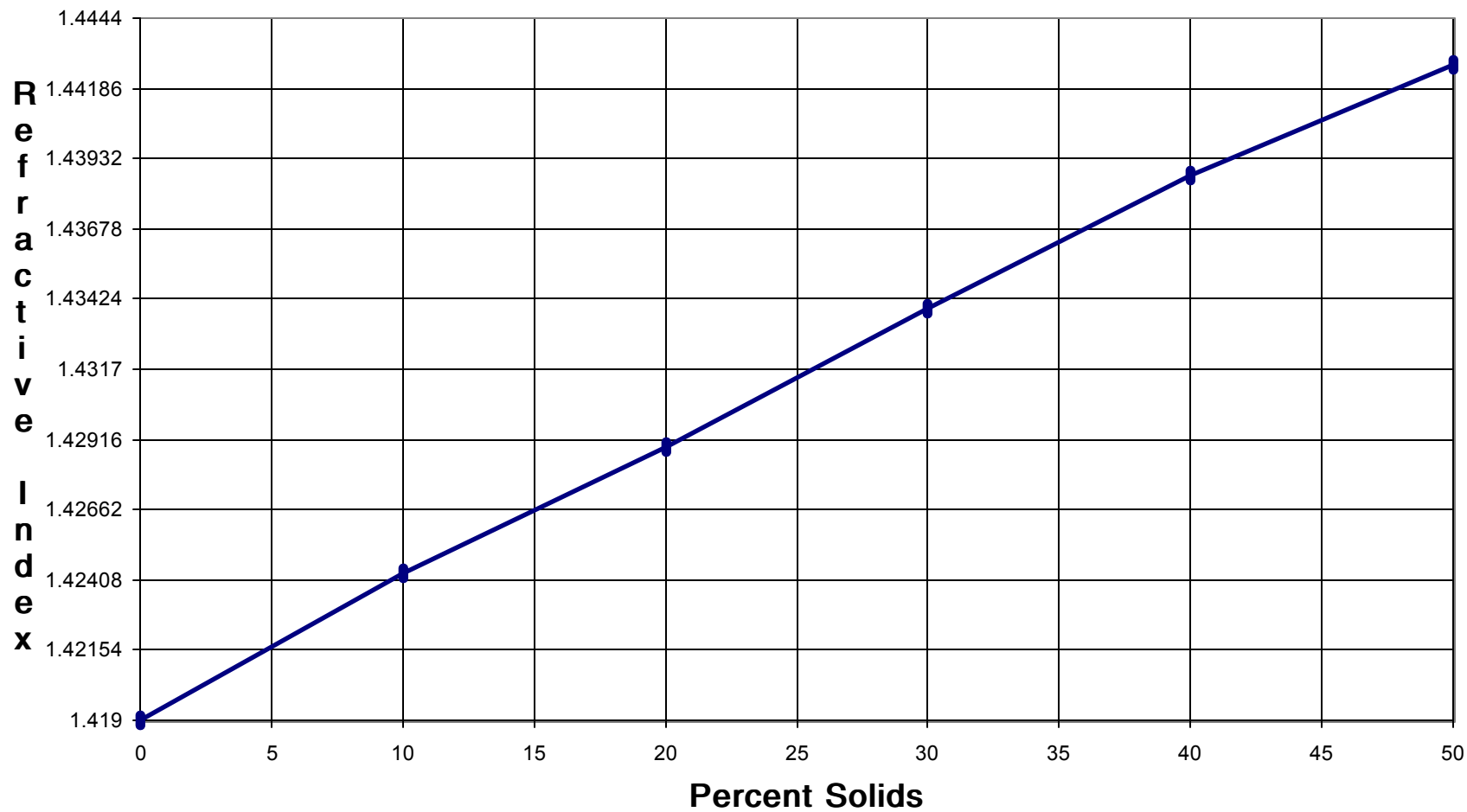
Oil, Water Soluble

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 1/30/91	0	1.333	7.5	1.34366						
Test: S-115	2	1.33572								
Chem:	3	1.33714								
Instr: Refract	4	1.33862								
	5	1.34025								



Oleum

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 5/29/96	0	1.419	50	1.4427						
Test: OLEUM	10	1.4243								
Chem: Oleum	20	1.4289								
Instr:	30	1.4339								
	40	1.4387								



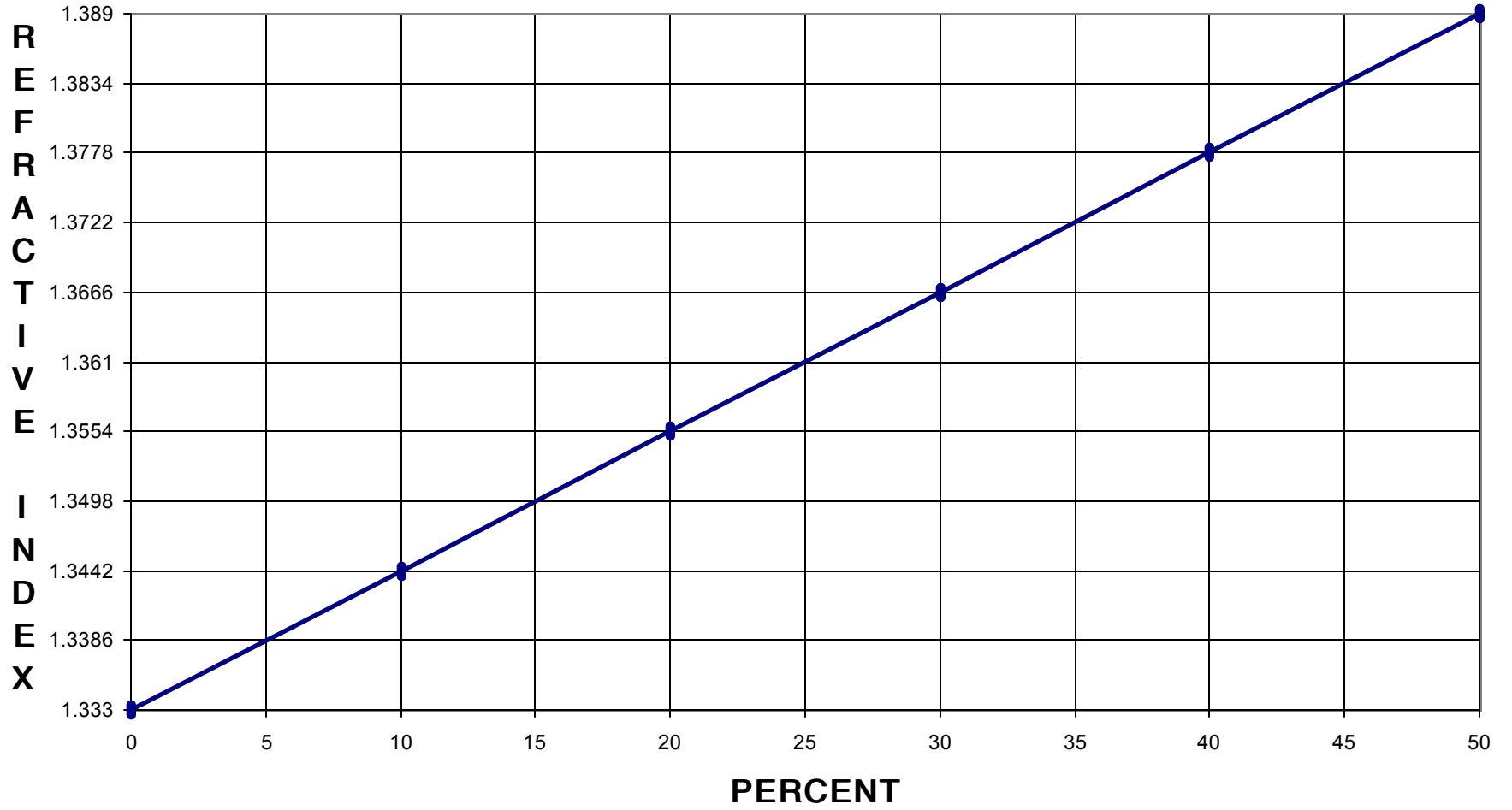
Phosphoric Acid

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 5/2/91	0	1.333								
Test: S-118C	0.5	1.3335								
Chem:	1.01	1.334								
Instr: Refract	1.54	1.3345								



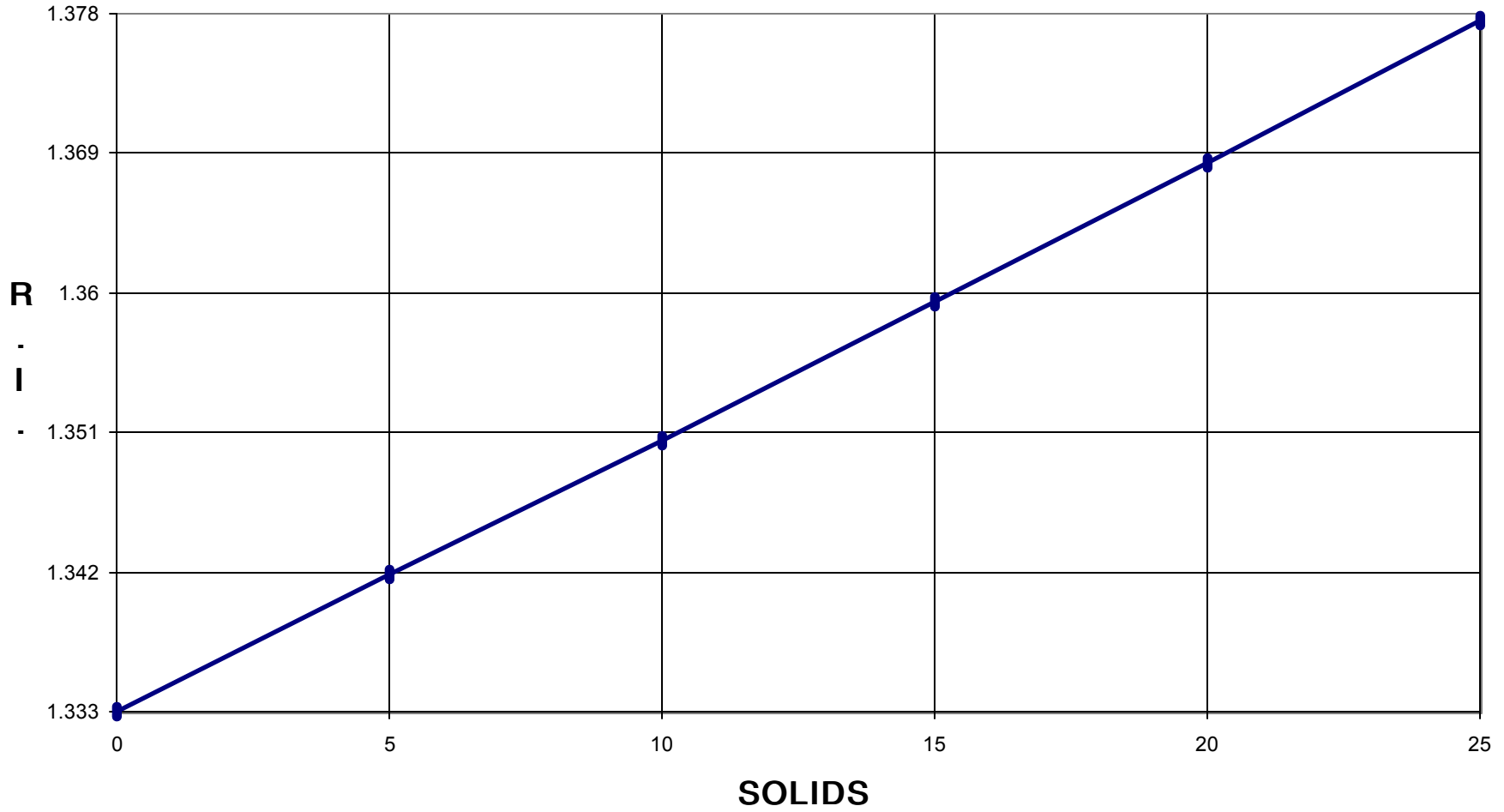
PROPYLENE GLYCOL

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 4/24/2000	0	1.333	50	1.389						
Test: SALES-2	10	1.3442								
Chem:	20	1.3554								
Instr:	30	1.3666								
	40	1.3778								



SODIUM CHLORIDE

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 9/21/95	0	1.333	25	1.3776						
Test: T-101	5	1.3418								
Chem: NaCl	10	1.3505								
Instr:	15	1.3594								
	20	1.3684								



Sodium Hydroxide

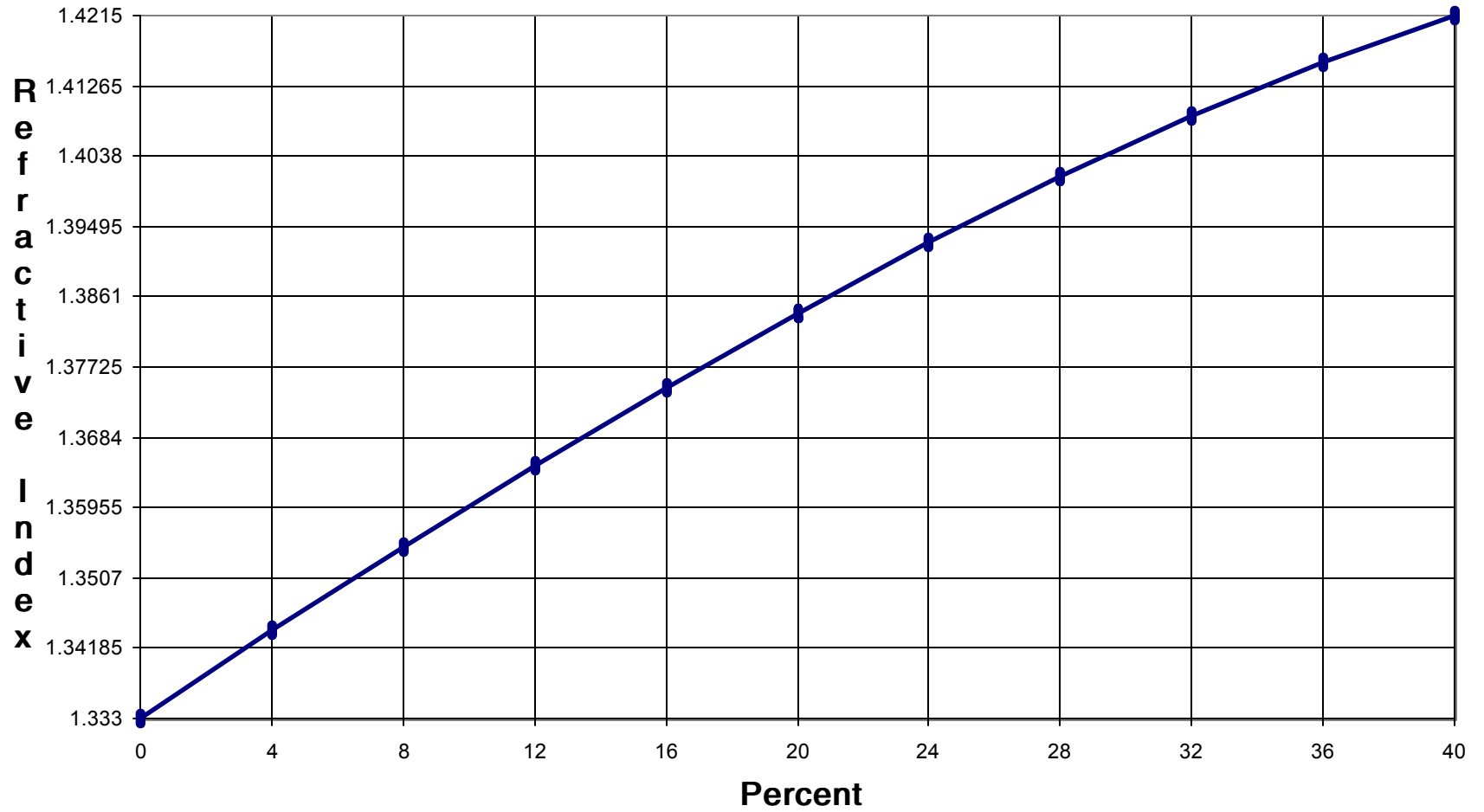
Electron Machine
Date: 5/26/94
Test: S-135E
Chem: NaOH
Instr: Refract

X	Y	X	Y	X	Y	X	Y	X	Y
0.52	1.3345	3.03	1.3415						
1.05	1.3336	3.4	1.3425						
1.58	1.3375	4.33	1.345						
2.12	1.3339	5.08	1.347						
2.48	1.34								



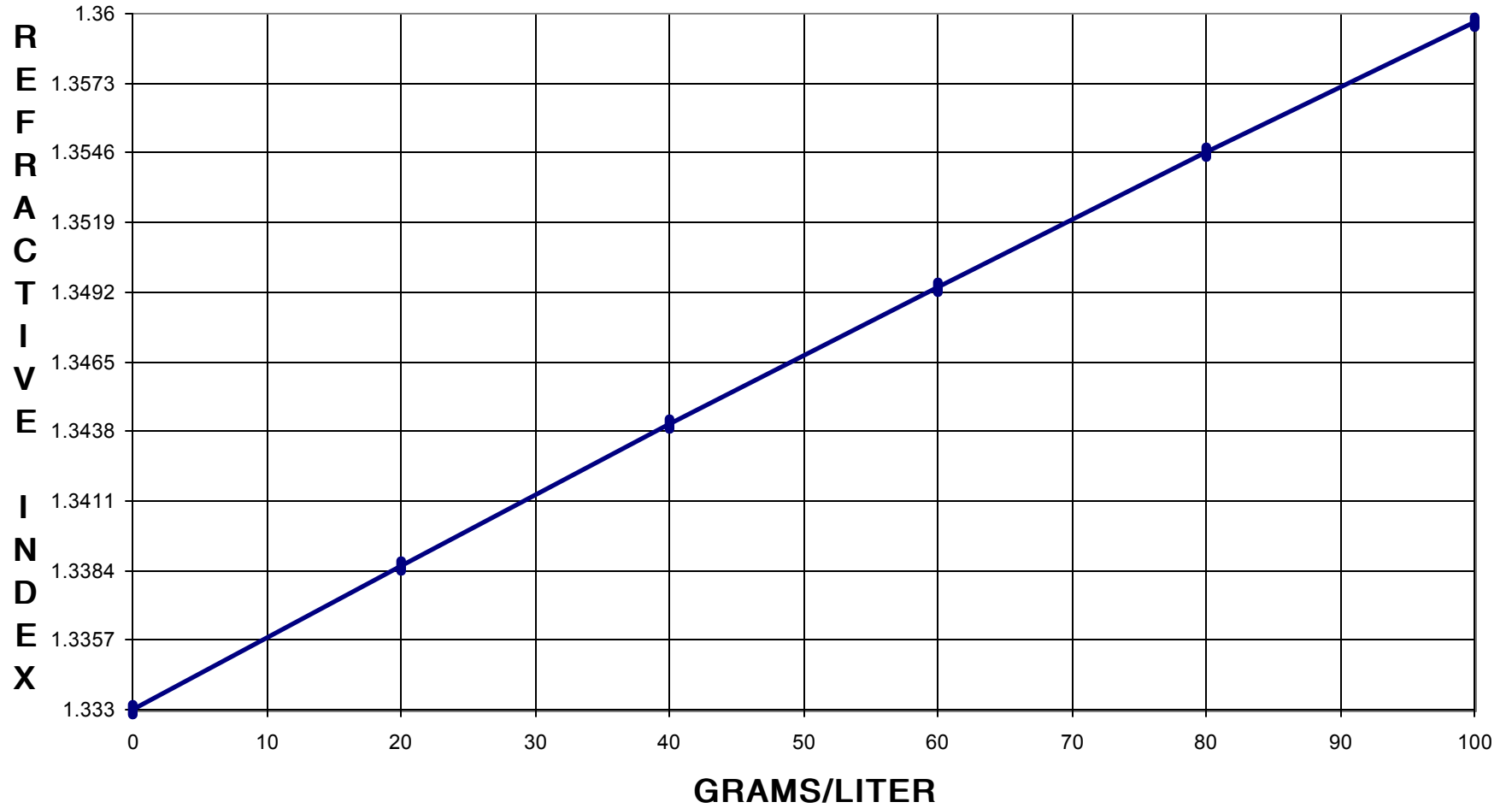
Sodium Hydroxide 0-40%

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 8/30/2000	0	1.333	20	1.384	40	1.4215				
Test: SODIUM HYD	4	1.3441	24	1.3929						
Chem:	8	1.3546	28	1.4012						
Instr: CRC	12	1.3648	32	1.4088						
	16	1.3746	36	1.4156						



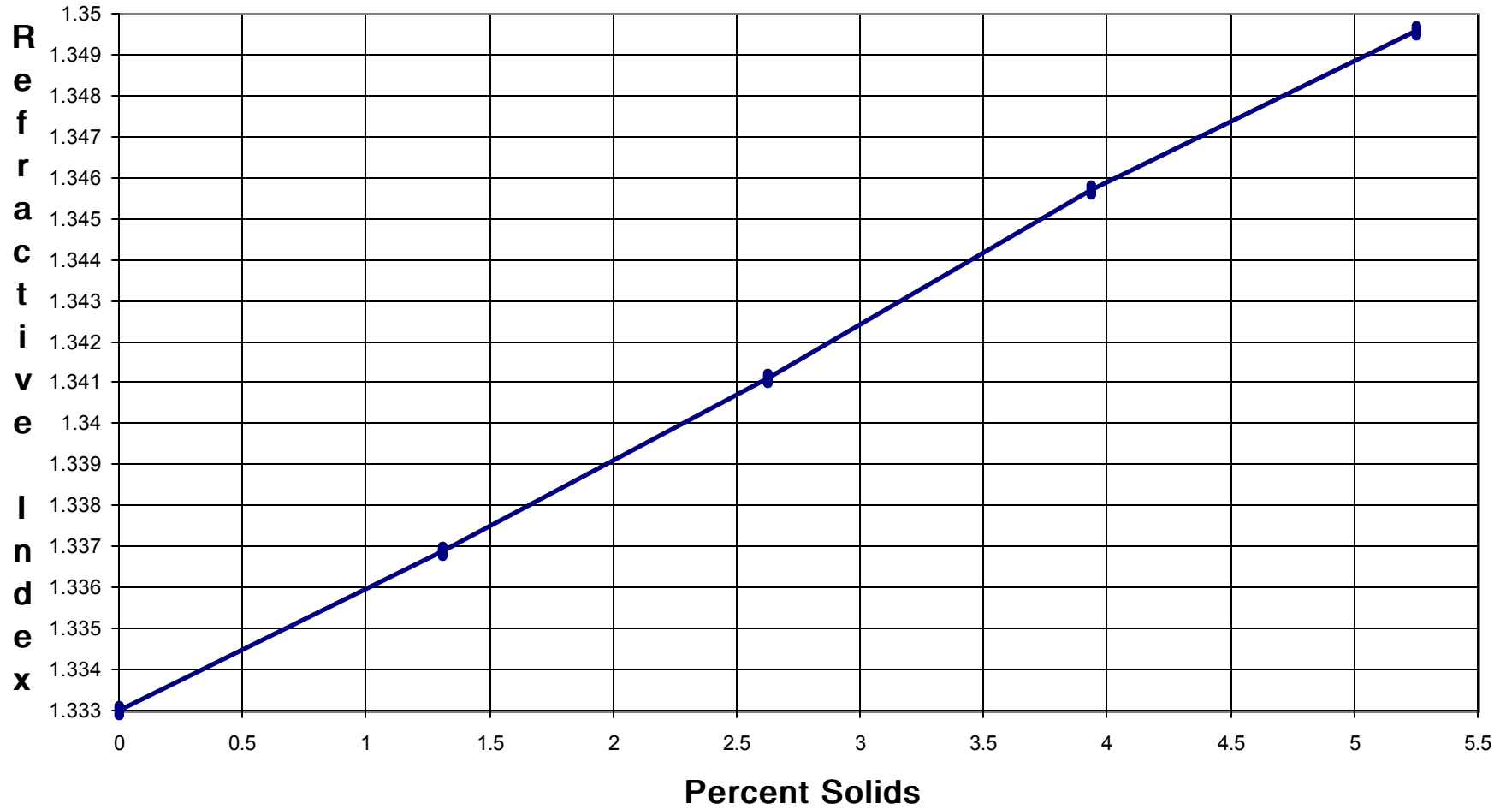
NaOH SODIUM HYDROXIDE

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 2/15/96	0	1.333	100	1.3597						
Test: T-103	20	1.3386								
Chem:	40	1.3441								
Instr: CRC	60	1.3494								
	80	1.3546								



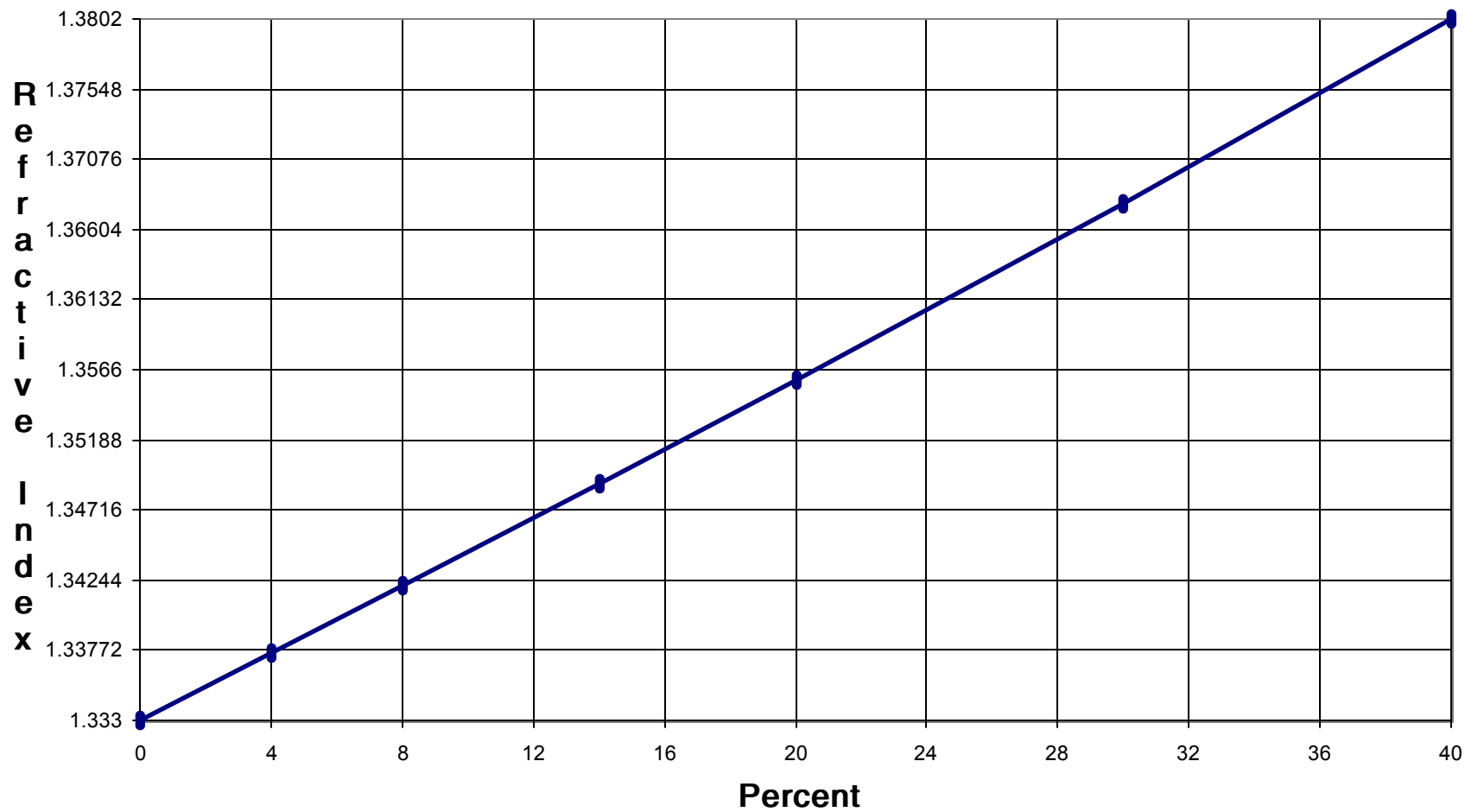
Sodium Hypochlorite (bleach)

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 4/4/91	0	1.333								
Test: S-116	1.3125	1.3369								
Chem: NaOCl	2.625	1.3411								
Instr: ABBE	3.9375	1.3457								
	5.25	1.3496								



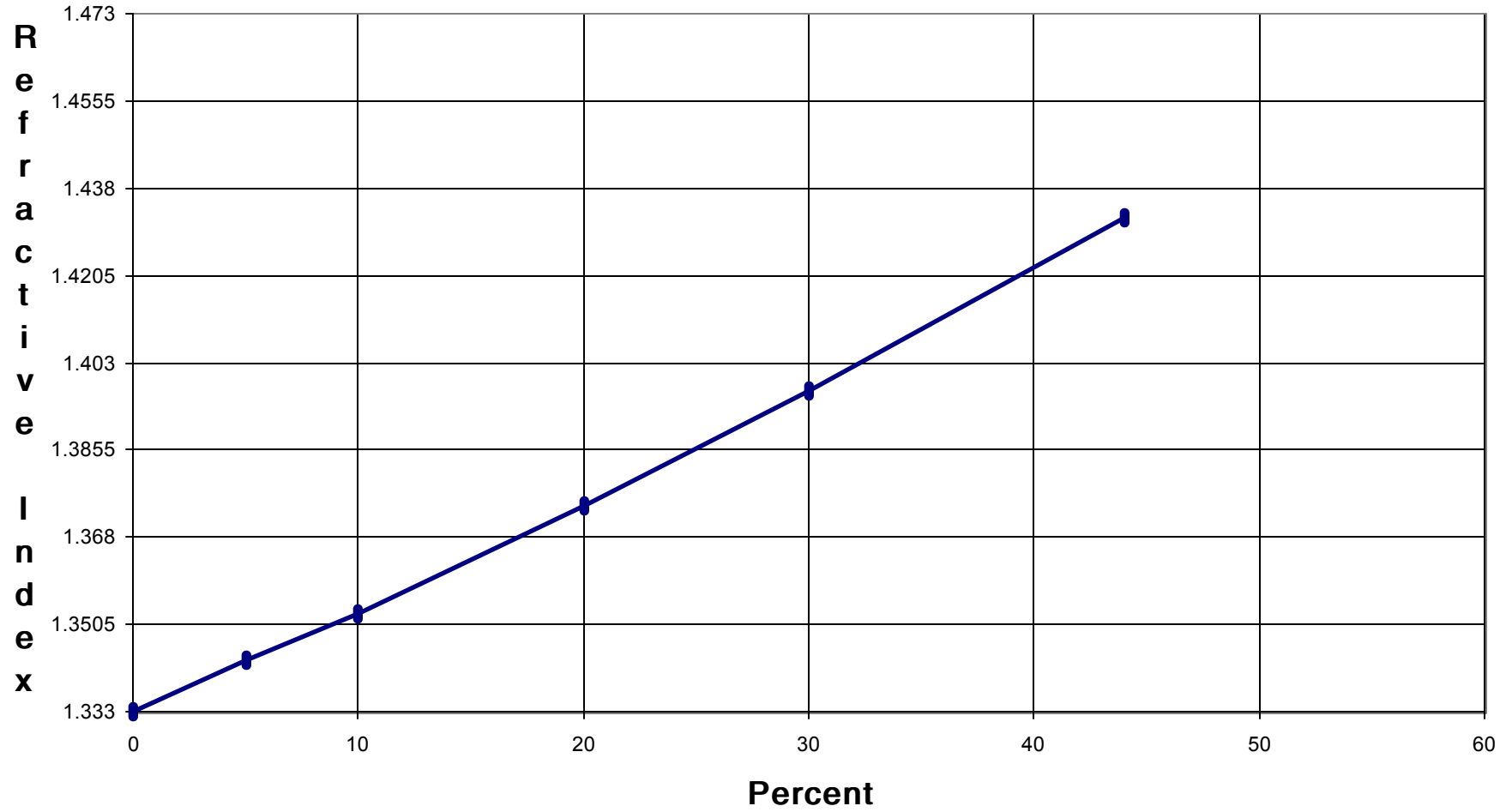
Sodium Nitrate 0-40%

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 8/30/2000	0	1.333	30	1.3678						
Test: SODIUM NIT	4	1.3375	40	1.3802						
Chem:	8	1.3421								
Instr: CRC	14	1.3489								
	20	1.3559								



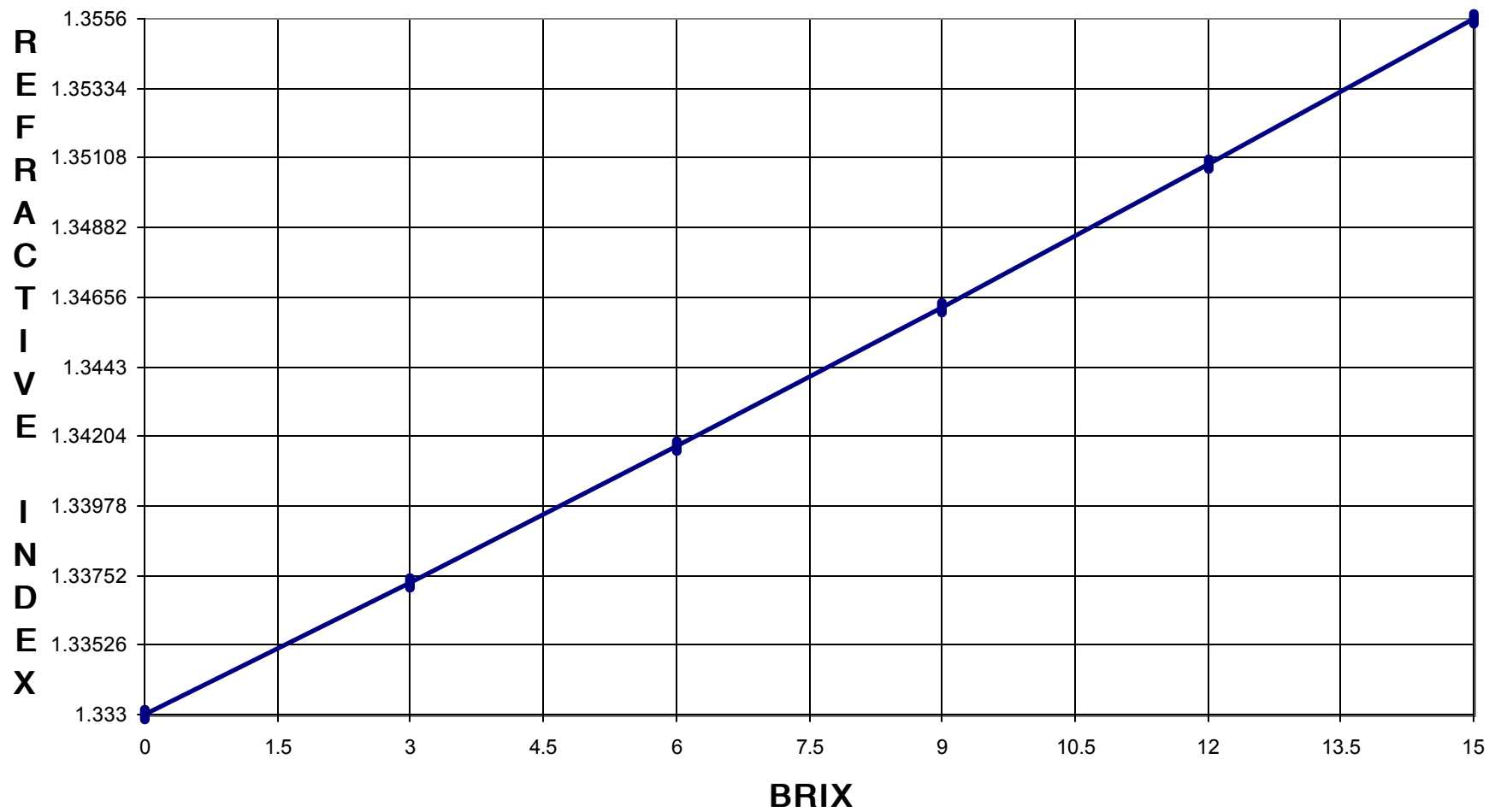
Sodium Silicate

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 2/26/92	0	1.333	44	1.4322						
Test: S-130B	5	1.3434								
Chem:	10	1.3525								
Instr: Refract	20	1.3742								
	30	1.3972								



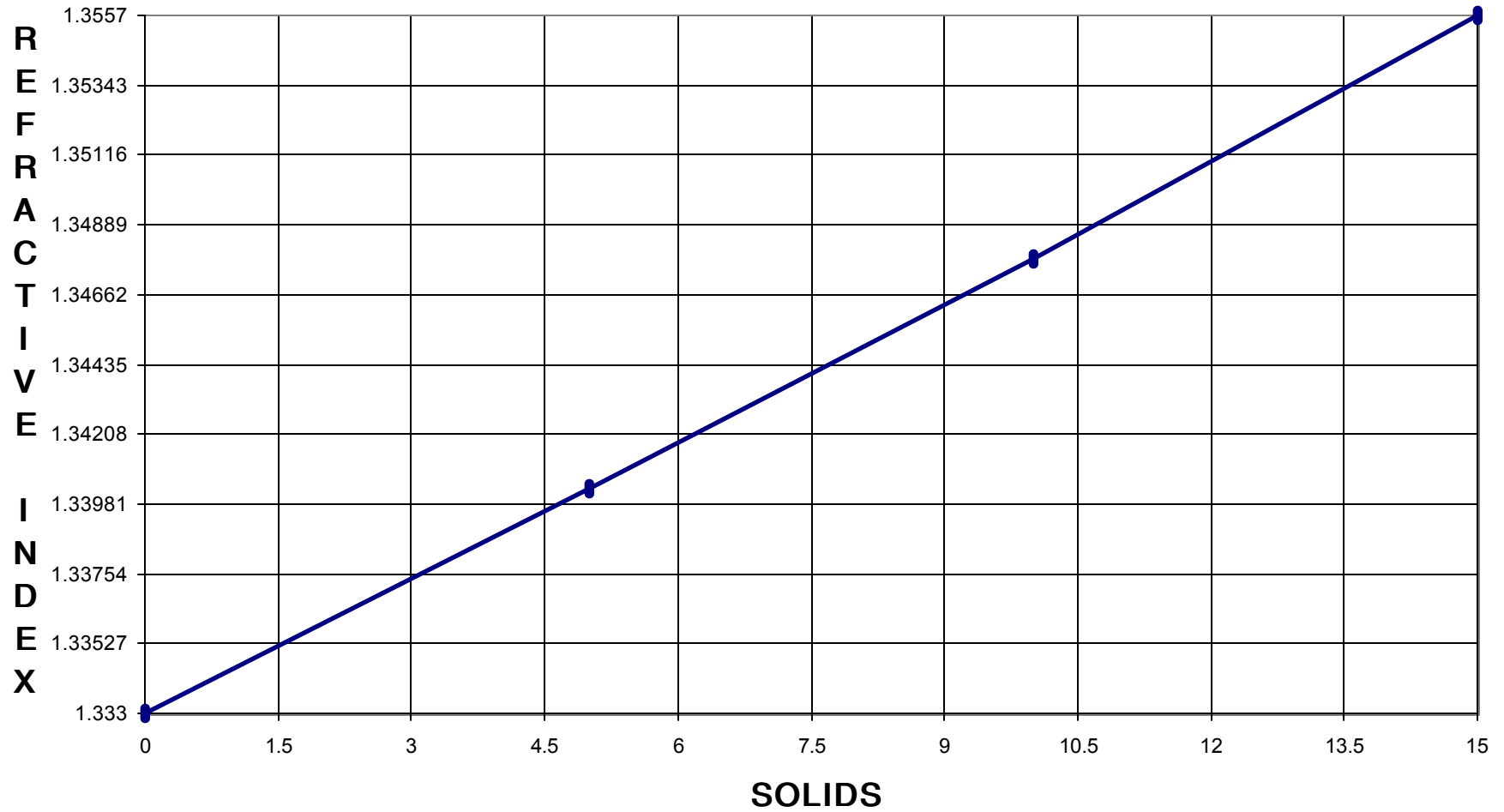
SOFT DRINKS Brix/R.I.

	X	Y	X	Y	X	Y	X	Y	X	Y
Electron Machine	0	1.333	15	1.3556						
Date: 2/5/98	3	1.3373								
Test: S-129A	6	1.3417								
Chem:	9	1.3462								
Instr: mpr e-scan	12	1.3509								



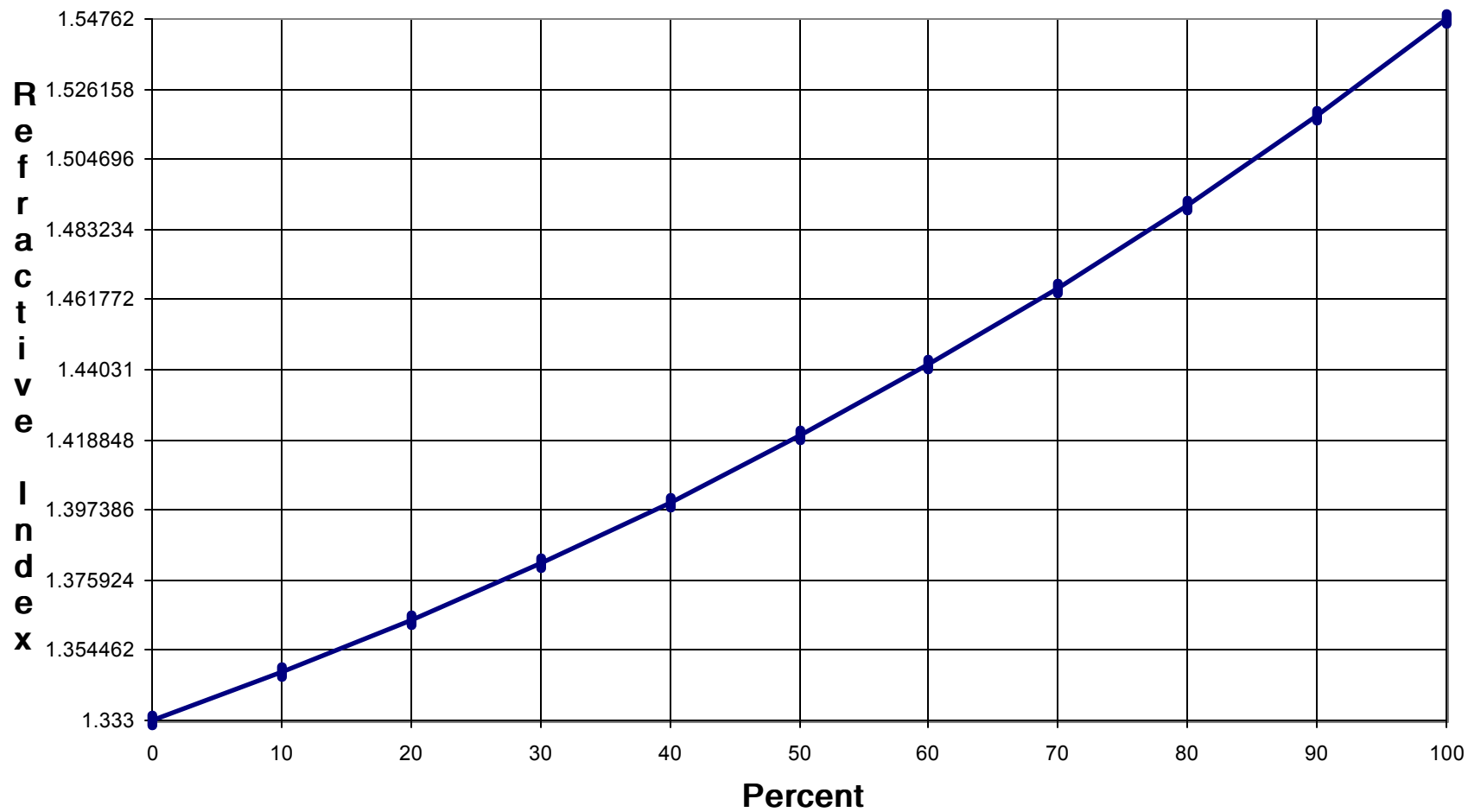
STARCH

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 4/27/94	0	1.333								
Test: TEST	5	1.3403								
Chem:	10	1.3478								
Instr: MPR-83	15	1.3557								



Sucrose 0-100%

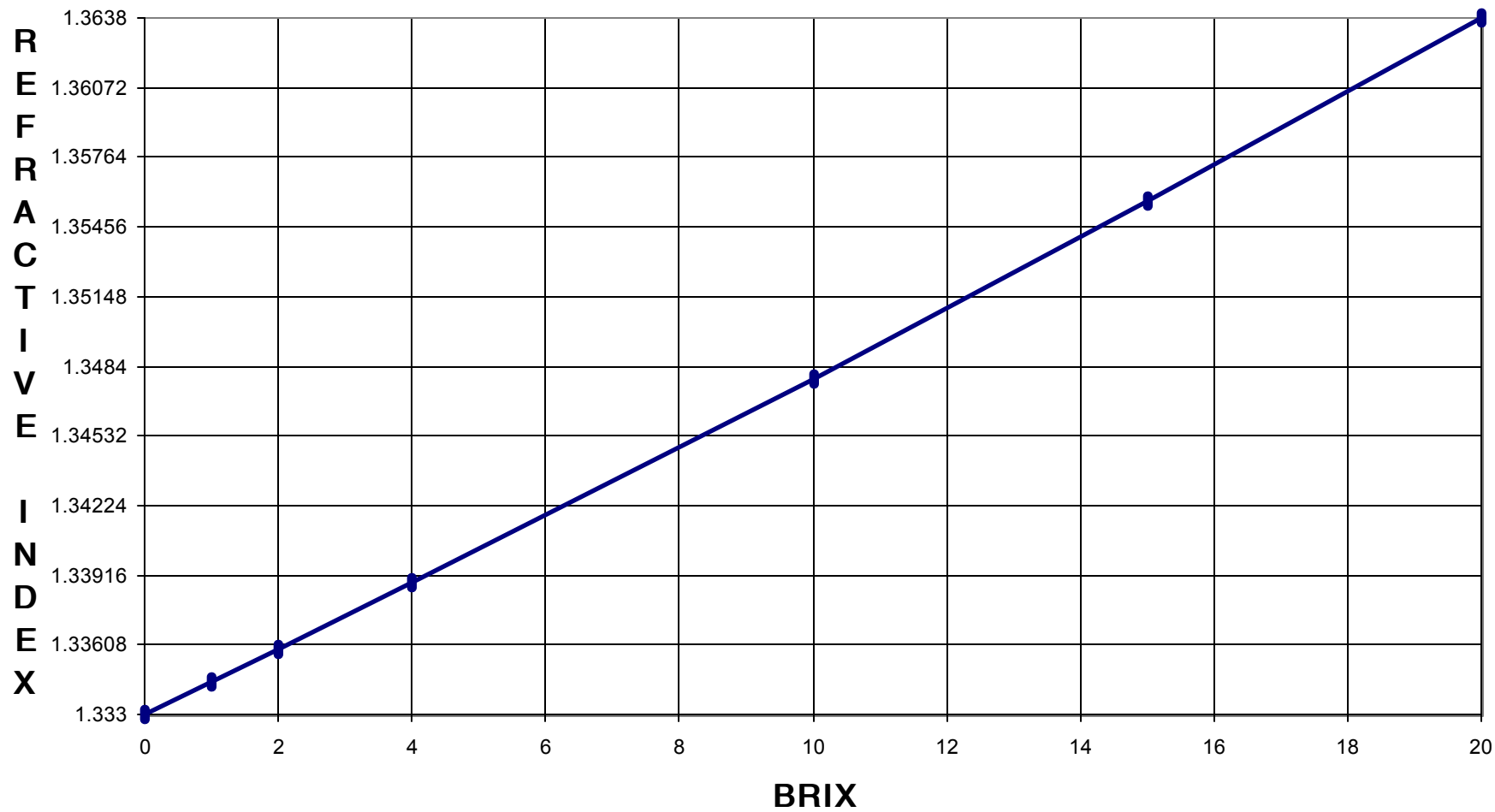
Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 8/30/2000	0	1.333	50	1.42004	100	1.54762				
Test: SUCROSE	10	1.34782	60	1.44187						
Chem:	20	1.36382	70	1.46539						
Instr:	30	1.38111	80	1.49069						
	40	1.39982	90	1.51796						



SUCROSE

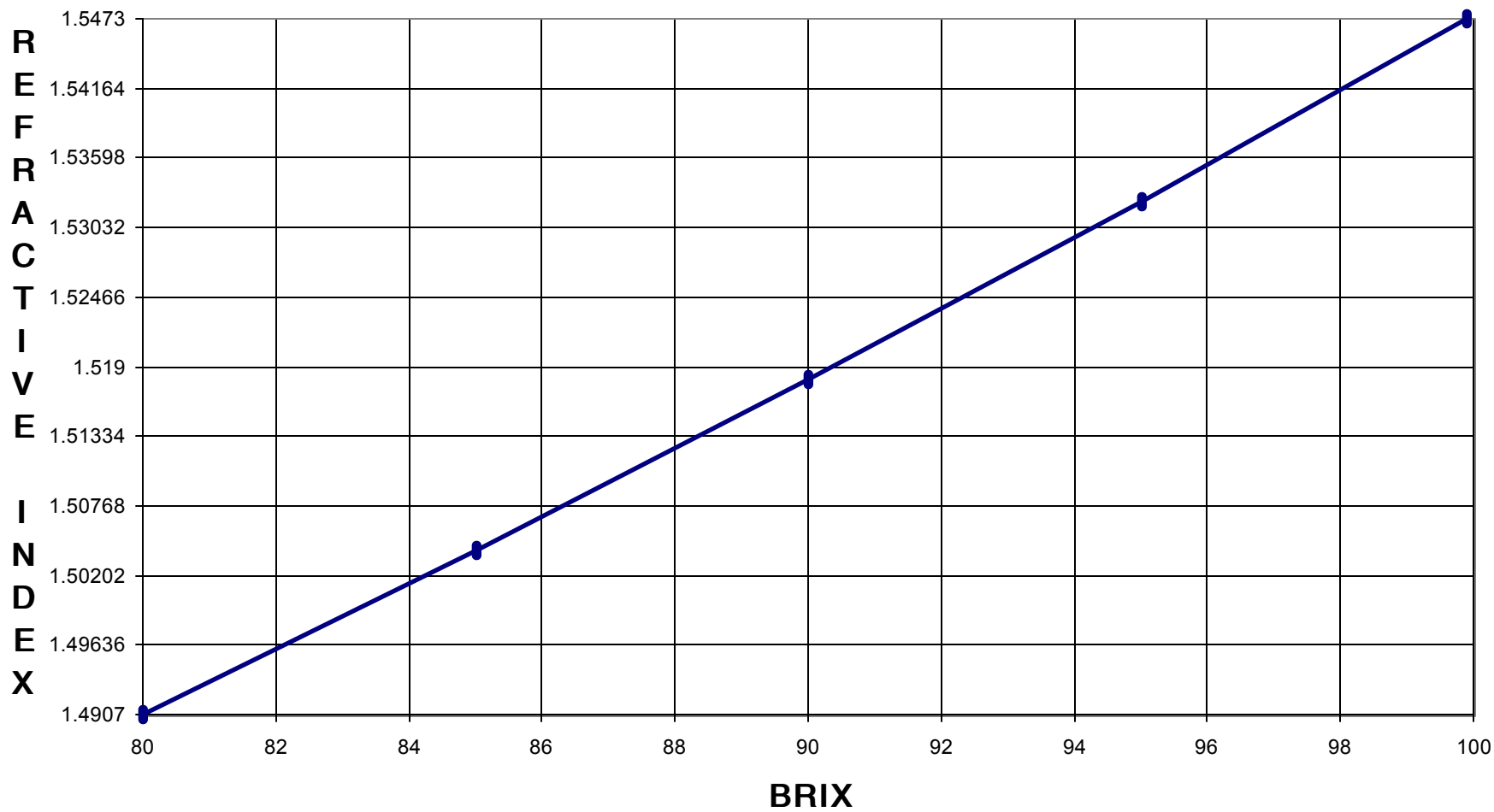
Electron Machine
Date: 3/19/98
Test: T98-12B
Chem:
Instr: ABBE

X	Y	X	Y	X	Y	X	Y	X	Y
0	1.333	15	1.3557						
1	1.3344	20	1.3638						
2	1.3359								
4	1.3388								
10	1.3478								



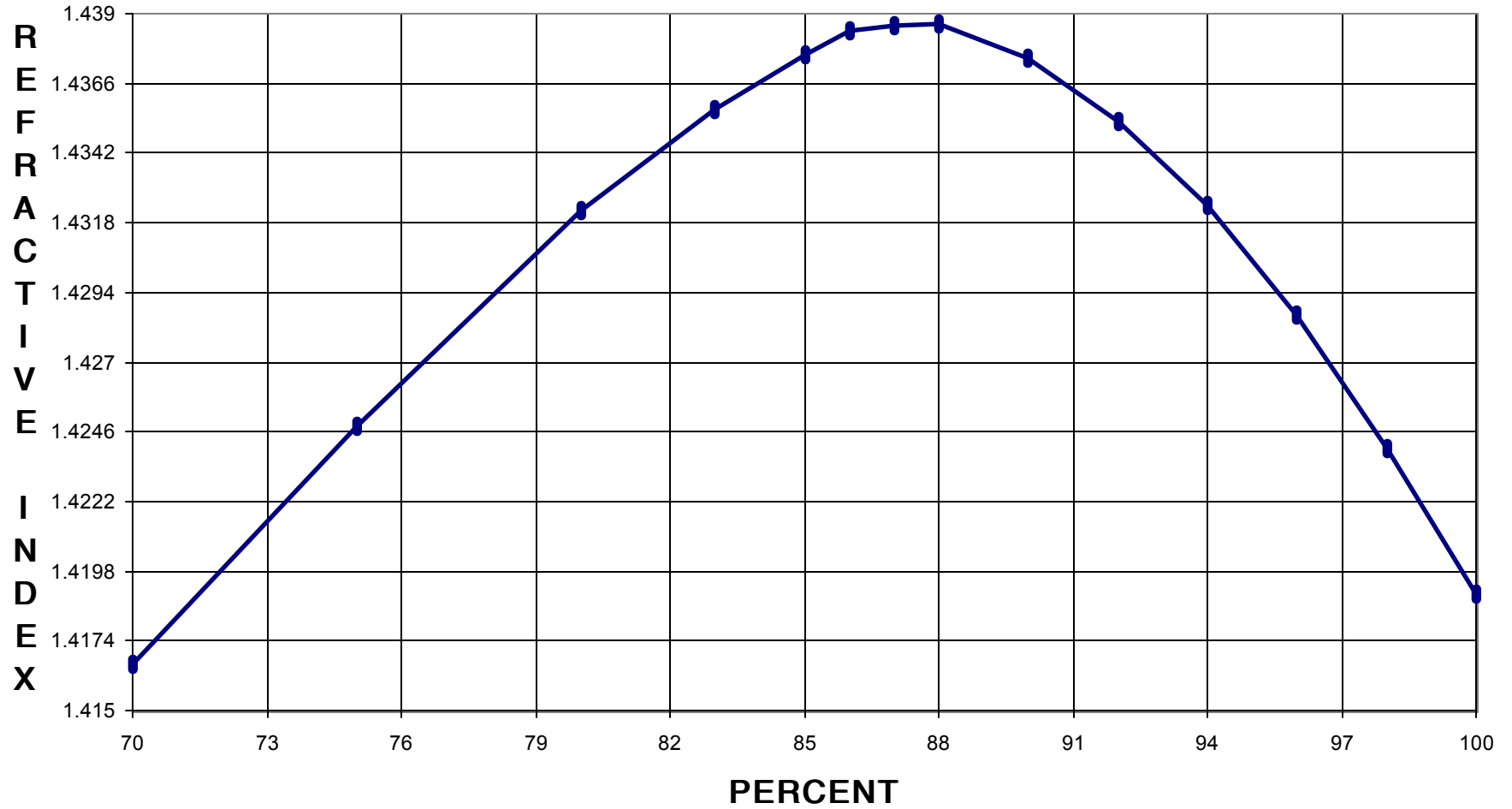
SUCROSE

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 9/5/96	80	1.4907								
Test: BRIX-1	85	1.5041								
Chem:	90	1.518								
Instr: ABBE	95	1.5324								
	99.9	1.5473								



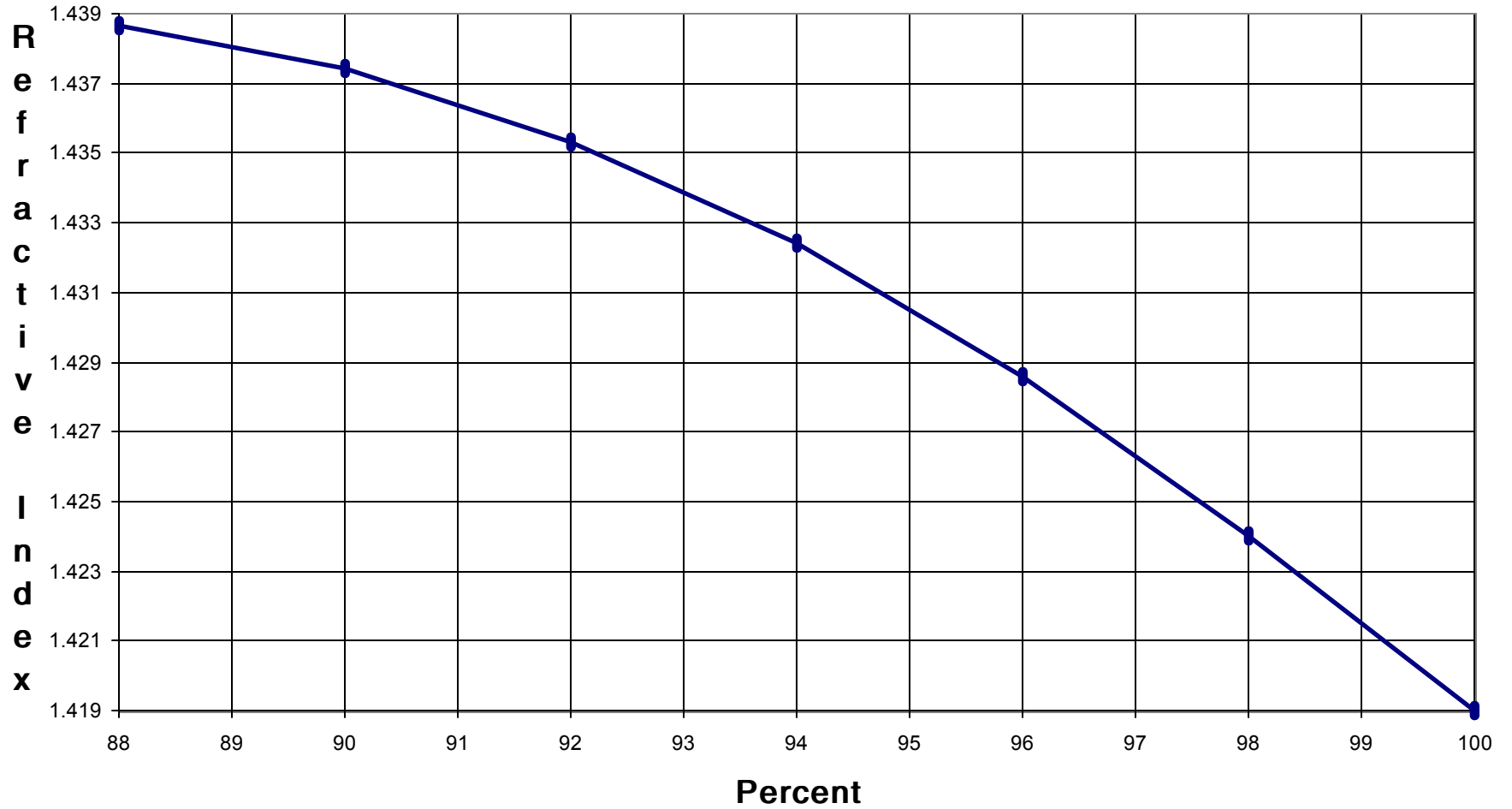
SULFURIC ACID

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 7/14/2000	70	1.4166	86	1.4384	94	1.4324				
Test: S-138	75	1.4248	87	1.4386	96	1.4286				
Chem:	80	1.4322	88	1.43866	98	1.424				
Instr: CRC	83	1.4357	90	1.43744	100	1.419				
	85	1.4376	92	1.4353						



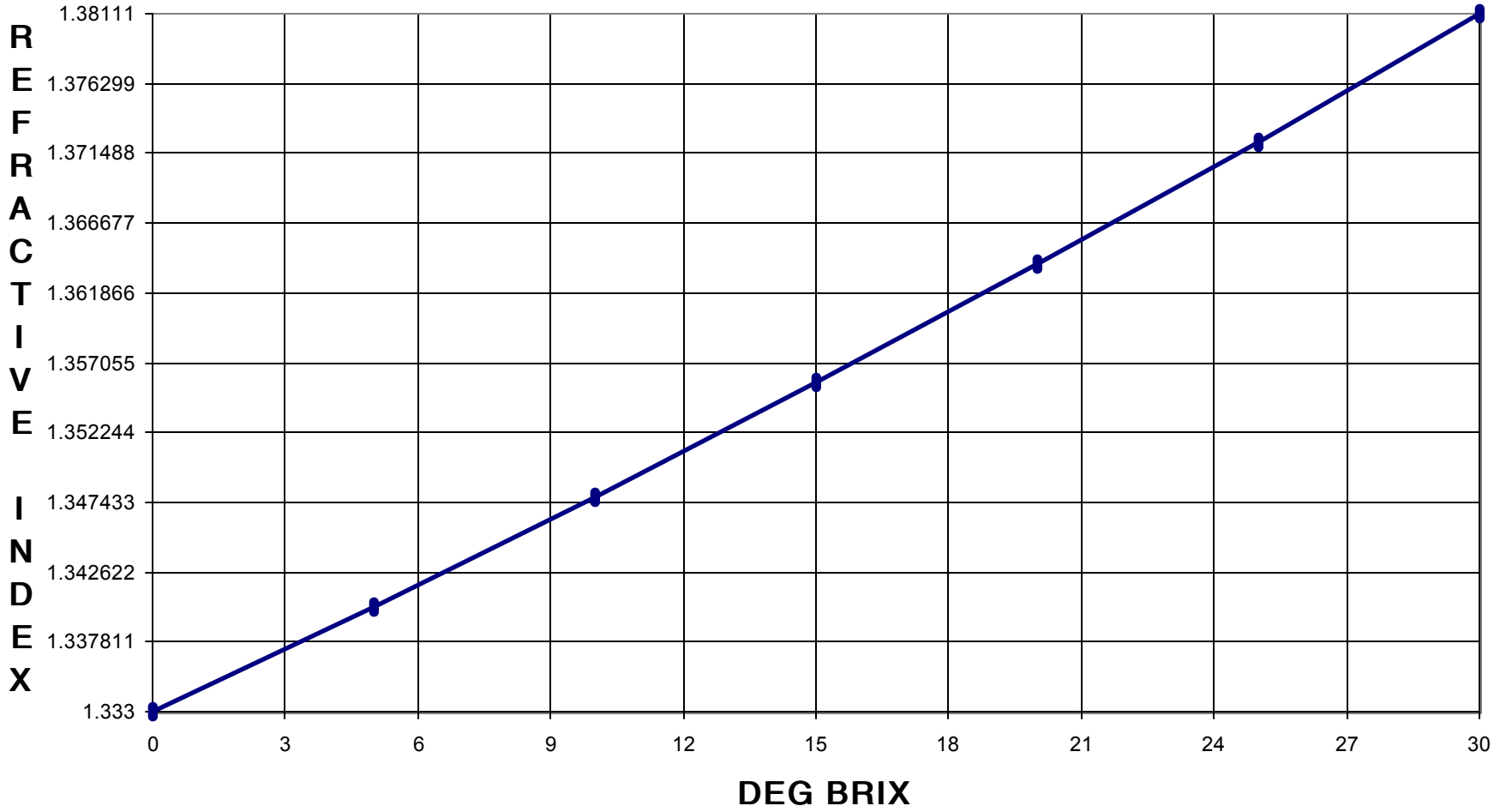
Sulfuric Acid

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 6/4/91	88	1.43866	98	1.424						
Test: S-120	90	1.43744	100	1.419						
Chem: H2SO4	92	1.4353								
Instr: Refract	94	1.4324								
	96	1.4286								



TOMATO PASTE

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 3/22/2000	0	1.333	25	1.3723						
Test: TOMATO	5	1.34026	30	1.38111						
Chem:	10	1.34782								
Instr: MPR-E-SCAN	15	1.35566								
	20	1.36382								



Urea 0-44%

Electron Machine	X	Y	X	Y	X	Y	X	Y	X	Y
Date: 8/30/2000	0	1.333	30	1.3785						
Test: UREA	6	1.3416	36	1.3881						
Chem:	12	1.3506	40	1.3947						
Instr: CRC	18	1.3599	44	1.4018						
	24	1.3692								

