smiths

Smiths Detection

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August 18, 2004

Mr Tomas Herrera
United States Nuclear Regulatory Commission
One White Flint North
11555 Rockville Pike, Rockville
Maryland 20852-2738
U.S.A.

Ref: Registry of Radioactive Sealed Sources and Devices # NR-163-D-101-G

Dear Mr Herrera,

Thank you for your letter dated July 27, 2004 requesting further information for the application to add Sabre 4000 and IONSCAN 500DT to Smiths Detection's registration certificate. Further to my emails of August 9th and 18th, 2004, I would wish to address the outstanding matters.

Item 2.2 (Conditions of Use)
The outer casing used for the Sabre 4000 unit is identical to that used for the Sabre 2000, the material being ABS/PC resin at 1/8" thickness for the entire shell. Please see attached data sheet for the material.

Item 5.1 (Radiation Profiles)
Please see the copy of the written records maintained for radiation leak testing dated May 14, 2004. The IPC-9025 is calibrated daily according to the manufacturer's recommendations using a reference source (copy of certificate of calibration of this source is also included in the supporting documentation). The IPC-9025 instrument is automated and only requires a single successful reference source reading for calibration.

Item 5.2 (Radiation Profiles)
Please see the copy of the written records maintained for radiation leak testing dated January 13, 2004. The MPC-9400 is calibrated daily using the same reference source used for the IPC-9025 instrument. The MPC-9400 is a manual instrument where 3 reference source readings are averaged for calibration according to the procedure for this instrument.

Item 6 (Installation, Servicing and Instructions to Users)
Please see the Sabre 4000 operators manual enclosed with this communication. Unfortunately the operators manual for the IONSCAN 500DT is still in its draft stage and a final version is not available at this time.

Item 8 (Proprietary Information)
Please see enclosed affidavit detailing the non-disclosure of proprietary information: specifically the engineering drawings, bills of materials and operator manuals supplied to support this application. The drawings illustrating the Sabre 4000 and IONSCAN 500DT and their dimensions are not considered proprietary.

Yours sincerely,

Georgia Ranger Ph.D.
Radiation Safety Officer

IDES

Data Sheet

Prospector Pro

Thursday, August 19, 2004

Bayblend® FR 110

Bayer MaterialScience LLC - *Acrylonitrile Butadiene Styrene + PC Alloy*

Unit System: English

Actions

-- - ISO

C - CAMPUS®

M - Multi-Point

S - Source This Material

E - E-mail a Data Sheet

Product Characteristics

Material Status	• Commercial: Active	
Availability	• North America	
Test Standards Available	• ASTM • ISO 10350	
Additive	• Ignition Resistant	
Features	• Color Stability, Good • Dimensional Stability, Good • Flame Retardant • Impact Resistance, Good • Processability, Good	• Rigidity, High • Thermal Stability, Good • General Purpose • Heat Resistance, High • Impact Resistance, Low Temp.
Uses	• Appliances • Automotive Interior Parts • Packaging • Electrical/Electronic Applications • Lawn and Garden Equipment	• Household Goods • Automotive Exterior Parts • Business Equipment • Sheet • Profiles
Appearance	• Colors Available • Natural Color • Black	
Forms	• Pellets	
Processing Method	• Injection Molding • Extrusion	
Multi-Point Data	• Isothermal Stress vs. Strain (ISO 11403-1) • Secant Modulus vs. Strain (ISO 11403-1)	• Shear Modulus vs. Temperature (ISO 11403-2) • Viscosity vs. Shear Rate (ISO 11403-2)

Properties [1]

Physical	Nominal Values (English)	Test Method
Density -Specific Gravity	1.19 sp gr 23/23°C	ASTM D792
Melt Mass-Flow Rate (MFR) (250°C/5.0 kg)	35.0 g/10 min	ASTM D1238
Mold Shrink, Linear-Flow	0.0040 to 0.0060 in/in	ASTM D955

Mechanical	Nominal Values (English)	Test Method
Tensile Modulus	380000 psi	ASTM D638
Tensile Strength @ Yield	8700 psi	ASTM D638
Tensile Strength @ Break	8100 psi	ASTM D638
Tensile Elongation @ Yld	4.0 %	ASTM D638
Tensile Elongation @ Brk	90 %	ASTM D638
Flexural Modulus	390000 psi	ASTM D790
Flexural Strength	13800 psi	ASTM D790

Impact	Nominal Values (English)	Test Method

Notched Izod Impact (73 °F, 0.125 in)	14.0	ft-lb/in	ASTM D256
Instrumented Dart Impact (73 °F, 0.125 in) [2]	Total Energy: 456	in-lb	ASTM D3763

Hardness	Nominal Values (English)		Test Method
Rockwell Hardness (R-Scale)	122		ASTM D785

Thermal	Nominal Values (English)		Test Method
DTUL @264psi - Unannealed (0.250 in)	203	°F	ASTM D648
DTUL @66psi - Unannealed (0.250 in)	212	°F	ASTM D648
Vicat Softening Point (Rate B)	226	°F	ASTM D1525
CLTE, Flow (TMA)	4.3E-005	in/in/°F	ASTM E831

Electrical	Nominal Values (English)		Test Method
Surface Resistivity	1.0E+014	ohms	ASTM D257
Volume Resistivity	1.0E+015	ohm-cm	ASTM D257
Dielectric Strength	760	V/mil	ASTM D149
Dielectric Constant			ASTM D150
(100 Hz)	3.000		
(1000000 Hz)	2.900		
Dissipation Factor			ASTM D150
(100 Hz)	0.0040		
(1000000 Hz)	0.0070		
Arc Resistance (0.118 in)	90.0	sec	ASTM D495

Ignition Characteristics	Nominal Values (English)	Test Method
Flame Rating - UL		UL 94
(0.0590 in)	V-0	
(0.0790 in)	V-0	
(0.0790 in)	5VB	
(0.118 in)	V-0	
(0.118 in)	5VA	
Limiting Oxygen Index	30 %	ASTM D2863

UL 746	Nominal Values (English)		Test Method
Rel Temp Indx Mech w/oImp (0.0620 in)	185	°F	UL 746
Rel Temp Indx Mech w/Imp (0.0620 in)	185	°F	UL 746
Rel Temp Indx Elect (0.0620 in)	203	°F	UL 746
Comparative Track Index	300	V	UL 746
High Volt Arc Track Rate (0.118 in)	5.91	in/min	UL 746
Hot Wire Ignition			UL 746
(0.0591 in)	45	sec	
(0.118 in)	90	sec	
High Ampere Arc Ignition (0.0591 in)	120		UL 746

Additional Properties

Spiral Flow Length, Bayer Test Method, 0.1 in Thickness, 490°F Melt Temperature: 23 in
Flexural Stress, ASTM D790, 5% Strain: 13,800 psi

Processing Information

Injection Molding Parameters	Nominal Values (English)		Test Method
Drying Temperature	175 to 210	°F	
Drying Time	3.0 to 4.0	hr	
Suggested Max Moisture	0.020	%	
Suggested Max Regrind	20	%	
Rear Temperature	430 to 445	°F	
Middle Temperature	435 to 455	°F	
Front Temperature	445 to 465	°F	
Nozzle Temperature	485 to 505	°F	
Processing (Melt) Temp	430 to 520	°F	
Mold Temperature	120 to 175	°F	
Injection Pressure	10000 to 16000	psi	

Back Pressure	50.0 to 100	psi
Screw Speed	40 to 70	rpm
Clamp Tonnage	3.0 to 5.0	tons/in²
Screw L/D Ratio	20.0:1.0	
Screw Compression Ratio	2.0:1.0 to 3.0:1.0	

Notes

1 Typical properties; not to be construed as specifications.
2 15840 in/min

2
20908

	cpm.	R(Bq.)
7-400B-6326 (18074/ME 334)	ϕ	ϕ
8-400B-6309 (17996/ME 250)	175	6.2
9-400B-6315 (33727/ME 256)	40	1.4
10-400B-1012 (12974/G-2836)	7	0.2
11-400B-1542 (G-3721)	19	0.6
12-400B-6314 (33728/ME255)	ϕ	ϕ

May 14, 2004.

Av. 3 cpm.

Background: 2
R. source: 20908
E = .465 x 60 = 27.9

	Cpm.	R(Bq.)
1-500DT-6/7 (#2/MD 918-919) - outer casing of detector - cover open.	1	ϕ
2-500DT-6/7 (#2/MD 918-919) - outer casing of detector - cover closed.	ϕ	ϕ
3-500DT-6/7 (#2/MD 918-919/detector surface)	2	ϕ
4-500DT-6/7 (#2/MD 918-919/5 cm from detector surface)	2	ϕ
5-500DT-6/7 (#2/MD 918-919/30cm from detector surface)	1	ϕ
6-500DT-6/7 (#2/MD 918-919/100cm from detector surface)	1	ϕ
7-SAB-1961 (#6/MD 805/outer casing of detector - cover open)	ϕ	ϕ
8-SAB-1961 (#6/MD 805/outer casing of detector - cover closed)	1	ϕ
9-SAB-1961 (#6/MD 805/detector surface)	ϕ	ϕ
10-SAB-1961 (#6/MD 805/5 cm from detector surface)	ϕ	ϕ
11-SAB-1961 (#6/MD 805/30 cm from detector surface)	ϕ	ϕ
12-SAB-1961 (#6/MD 805/100cm from detector surface)	2	ϕ
13-400B-6328 (17990/ME 336)	ϕ	ϕ
14-400B-6288 (33726/ME 228)	1	ϕ
15-400B-6269 (33729/ME 207)	2	ϕ
16-400B-6228 (33730/MD 99)	1	ϕ
17-SAB-2207 (22211/ME 263)	2	ϕ
18-400B-777 (13270/G-2300)	1	ϕ
19-SAB-268 (LG 899)	1	ϕ
20-SAB-325 (G-2162)	3	ϕ
21-SAB-433 (G-2405)	3	ϕ
22-SAB-519 (G-2085)	1	ϕ
23-SAB-520 (G-2686)	ϕ	ϕ
24-SAB-640 (G-2904)	1	ϕ

THE SOURCE INCORPORATED

2810 Siler Lane
Santa Fe, NM 87501
(505) 473-9538
FAX: (505) 473-5805

Certificate of Calibration
(Beta Source)

OCT 28 1999

The Nickel 63 beta source was measured in a gas proportional counter using P-10 as counting gas. The beta emissions from the surface of the source were measured at its plateau voltage to determine its 2π particle emission rate (i.e. particles per minute). Corrections were applied for background, coincidence loss and backscatter factors when applicable.

Beta standard 4288-51 is our NIST calibrated source used in establishing NIST traceability following ANSI N42.22 participating in the NIST radioactivity measurement assurance program annually.

REF.PO# _____

Model S-Ni-47

Active Diameter (or area) 44mm Mounting Material Ni

Total Diameter (or area) 47mm Thickness 0.79mm

22,500	ppm ±	1,125	ppm 2π
45,000	dpm ±	2,250	dpm 4π
0.0203	uCi		Bq
11/03/99	date of measurement		
99NI4702626	source serial number		
5.0	overall uncertainty (percent)		
0.0	backscatter (percent)		

Michael A. Ortiz . . . . Calibration Manager

Vera Padilla . . Quality Control

<2200 dpm leak test results (dpm/100cm²)

The overall uncertainty of the measurement is three times the value found from combining quadratically the sum of the overall uncertainty reported by NIST in the radioactive measurements assurance program; the standard deviation of the mean for the NIST standard as measured in the system used for calibration; and the standard deviation of the mean for the source measurements.

AC006-97

(over)

Nov/18/99

per Michael Ortiz - source will not require periodic recalibration provided there is no significant changes in the reading history. -Pu

20031

	1st	2nd	Total	R(Bq.)
44-400B-4922 (33097/KY 492)	93	87	180	0.2
45-400B-4478 (33098/KT 740)	78	98	176	ϕ
46-400B-4887 (33101/KY 457)	79	97	176	ϕ
47-400B-4717 (33103/KT 997)	103	91	194	0.7
48-400B-4916 (33105/KY 486)	101	89	190	0.5
49-5AB-1872 (21915/LK 798)	112	102	214	1.4
50-5AB-1812 (21918/LK 485)	94	88	182	0.2
51-5AB-1877 (21909/LK 806)	79	97	176	ϕ
Left counter	78	98	176	ϕ
Right "	97	79	176	ϕ

Jan. 13, 2004.

	1st	2nd	3rd	Ave.
• Background:	73	80	68	74×2=148
• Ref. Source:	20031	21088	21029	20716

• E = .459 ×60 = 27.5

	1st	2nd	Total	R(Bq.)
1-PIMS-197 (LK 775)	79	77	156	0.3
2-5AB-1863 (21922/LK 752)	80	76	156	0.3
3-5AB-1853 (21890/LK 742)	71	77	148	ϕ
4-5AB-1796 (21870/LK 469)	83	79	162	0.5

738068

	1st	2nd	Total	R(Bq.)
5-400B-3818 (33113/G-5308)	93	85	178	1.1
6-400B-5040 (33114/KY 611)	76	72	148	ϕ
7-400B-4820 (33115/KY 390)	86	82	168	0.7
8-400B-4910 (33119/KY 480)	75	73	148	ϕ
9-400B-4863 (33122/KY 433)	80	76	156	0.3
10-400B-675 (33125/G-2095)	62	86	148	ϕ
11-400B-? (33129/KY 453)	43	105	148	ϕ
12-400B-5021 (33132/KY 592)	64	84	148	ϕ
13-5AB-1847 (21892/LK 734)	105	91	196	1.7
14-400B-4882 (33133/KY 452)	75	73	148	ϕ
15-400B-4889 (33135/KY 459)	66	82	148	ϕ
16-400C-2 (500 DT) (LN 819 - Background)	89	82	171	0.8
17-400B-5959 (17696/LK 853)	80	76	156	0.3
18-400B-5573 (17674/LA 439)	100	92	192	1.6
19-400B-4907 (33137/KY 477)	110	100	210	2.3
20-400B-4961 (33142/KY 532)	92	86	178	1.1
21-400B-5023 (33144/KY 594)	79	75	154	0.2