PRODUCT

EVALUATION

REPORT

TESTS PERFORMED FOR:

STANLEY ACCESS TECHNOLOGIES
ROUTE 6 & HYDE RD.
FARMINGTON, CT 06032

PROJECT NAME:

DURA-GLIDE 5000 TELESCOPING
SLIDING DOOR SYSTEM
CLEAN ROOM COMPATIBILITY EVALUATION

REPORT NUMBER: 098-96

JANUARY 10TH, 1997

TESTS PERFORMED BY:

OMNI TESTING, LTD.
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SWAMPSCOTT, MA 01907
(617) 598-4333

**PRODUCT
EVALUATION
REPORT FOR:** Jerry Colello
Stanley Access Technologies
Route 6 & Hyde Rd.
Farmington, CT 06032

REPORT DATE: January 10th, 1997
TEST DATE: December 20th, 1996
REPORT NUMBER: 098-96

TEST OBJECTIVE: To determine airborne particle levels contributed by Stanley Dura-Glide 5000 Telescoping Sliding Door System Clean Room door under normal operating conditions.

TEST DESCRIPTION: The Stanley Dura-Glide 5000 Telescoping Sliding Door System was installed in a Class 1, vertical laminar flow clean room, was cleaned by hand using cleaner and an alcohol and water solution, then sprayed down with cleaned compressed air, and was then tested for particle counts during normal operation. The automatic sliding door was tested for particle counts using three different methods:

First, particle counts were taken around the door using a Gorpler sampling probe. The Gorpler probe allows representative, average samples to be collected over an area of 12" X 15".

Second, counts were taken inside the drive housing in order to determine areas of high particle counts. Components inside the housing were then scanned (using the particle counter) with a probe to further localize areas of high particle generation.

Third, particle counts were taken on a 6 inch by 6 inch grid in the work zone. The work zone is defined as the horizontal plane two feet below the drive housing of the door. Particle counts were taken using a "Particle Measuring Systems" particle counter model 110. Counts were taken at a 1 CFM flow rate for the following particle sizes: all particles greater than or equal to 0.1 microns, 0.2 microns, 0.3 microns, 0.5 microns, 1.0 microns, and 5.0 microns. For each one minute sample, the door was exercised through one cycle of opening and closing as soon as sampling was started.

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REVIEW OF RESULTS

The initial Gorpler probe samples indicate that under normal operating conditions, in a vertical laminar flow clean room, the contribution of airborne particles by the Stanley Dura-Glide 5000 Telescoping Sliding Door System is such that it is suitable for use in a class 10 clean room. With a zero background level, the counts for all particle sizes per Federal Standard 209E met class 10.
Detailed results are on the following pages.

Tested by:

Glenn Kassiotis
OMNI Testing Limited

Grid Points For the
Gorpler Probe

FRONT

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |

MOTOR   DOOR

| 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 |

BACK
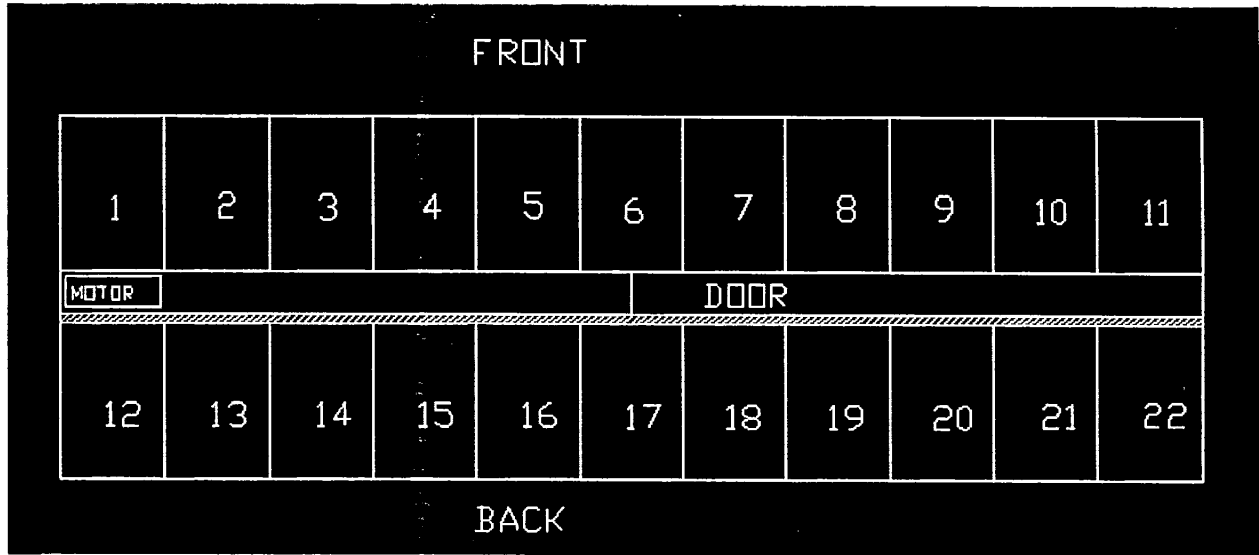
PARTICLE COUNT RESULTS FROM SAMPLES
TAKEN WITH GORPLER PROBE
Samples were taken 24 inches below the drive housing

Particle size in micrometers

Station	0.1	0.2	0.3	0.5	1	5
1	1	1	0	0	0	0
2	6	4	3	1	0	0
3	28	18	8	3	0	0
4	36	14	7	2	0	0
5	16	9	5	2	1	0
6	8	3	1	1	0	0
7	1	0	0	0	0	0
8	0	0	0	0	0	0
9	0	0	0	0	0	0
10	4	3	1	1	0	0
11	12	9	6	3	0	0
12	21	7	1	0	0	0
13	19	13	7	3	1	0
14	17	11	6	4	2	0
15	5	2	1	0	0	0
16	0	0	0	0	0	0
17	0	0	0	0	0	0
18	1	0	0	0	0	0
19	3	1	0	0	0	0
20	22	18	7	3	0	0
21	26	17	6	1	0	0
22	9	3	1	0	0	0
Average	10.68	6.05	2.73	1.09	0.18	0.00

Calculations of particulates on next page.

calculations at 0.5		calculations at 0.3	
# of locations	22	# of locations	22
Mean	1	Mean	2.64
Standard Deviation	1.55	Standard Deviation	3.11
Standard Error	0.33	Standard Error	0.66
UCL	N/A	UCL	N/A

calculations at 0.1		calculations at 0.2	
# of locations	22	# of locations	22
Mean	11.18	Mean	6.55
Standard Deviation	9.96	Standard Deviation	7.03
Standard Error	2.12	Standard Error	1.50
UCL	N/A	UCL	N/A

calculations at 1.0		calculations at 5.0	
# of locations	22	# of locations	22
Mean	0.27	Mean	0
Standard Deviation	0.65	Standard Deviation	0
Standard Error	0.14	Standard Error	0
UCL	N/A	UCL	N/A

Grid Points around the Drive Housing
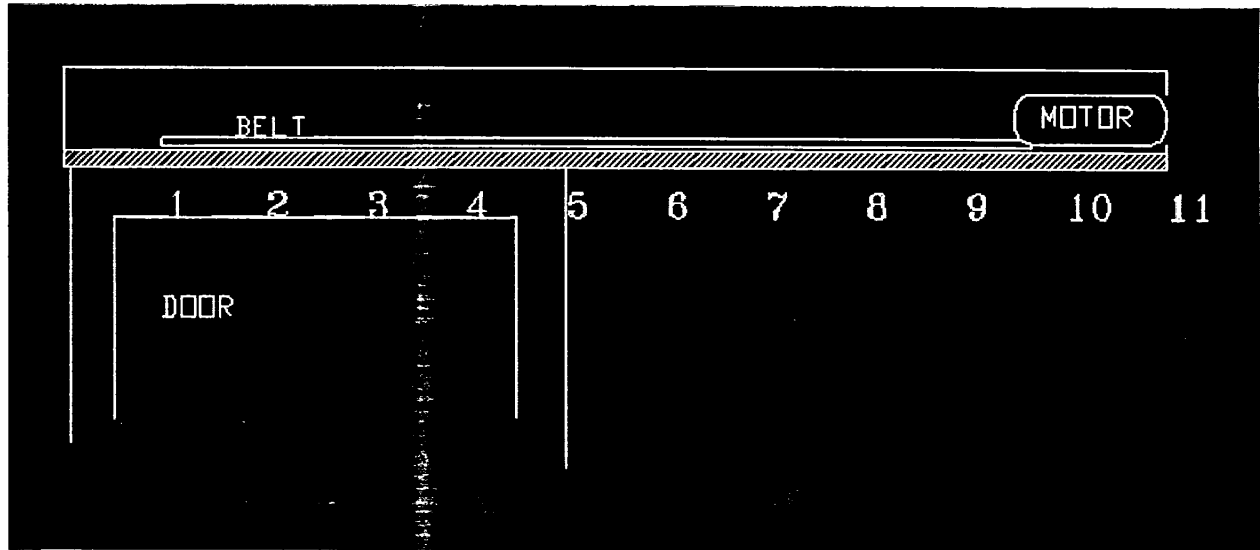
PARTICLE COUNT RESULTS OF SAMPLES
TAKEN IN FRONT OF DRIVE HOUSING

Particle size in micrometers

Station	0.1	0.2	0.3	0.5	1	5
1	11	10	5	3	1	0
2	34	27	15	6	2	0
3	25	16	8	2	0	0
4	15	7	3	1	0	0
5	3	1	1	0	0	0
6	0	0	0	0	0	0
7	2	1	0	0	0	0
8	0	0	0	0	0	0
9	17	12	8	4	1	0
10	9	4	2	2	1	0
11	3	1	0	0	0	0
Average	10.82	7.18	3.82	1.64	0.45	0.00

calculations at 0.5		calculations at 0.3	
# of locations	11	# of locations	11
Mean	1.64	Mean	3.82
Standard Deviation	2.01	Standard Deviation	4.81
Standard Error	0.61	Standard Error	1.45
UCL	N/A	UCL	N/A

calculations at 0.1		calculations at 0.2	
# of locations	11	# of locations	11
Mean	10.82	Mean	7.18
Standard Deviation	11.10	Standard Deviation	8.54
Standard Error	3.35	Standard Error	2.58
UCL	N/A	UCL	N/A

calculations at 1.0		calculations at 5.0	
# of locations	11	# of locations	11
Mean	0.45	Mean	0
Standard Deviation	0.69	Standard Deviation	0
Standard Error	0.21	Standard Error	0
UCL	N/A	UCL	N/A

Grid Points for
Particle Counts

FRONT

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44

| MOTOR | | | | | | | DOOR | | | | | | | | | | | | | | |

45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66
67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88

BACK

PARTICLE COUNT RESULTS FROM SAMPLES
TAKEN ON A 6" X 6" GRID IN THE WORK ZONE

Particle size in micrometers

Station	0.1	0.2	0.3	0.5	1	5
1	22	6	2	1	1	0
2	38	10	5	2	0	0
3	32	6	3	1	0	0
4	30	7	3	0	0	0
5	9	5	4	2	1	0
6	5	3	1	1	0	0
7	0	0	0	0	0	0
8	0	0	0	0	0	0
9	8	6	4	2	1	0
10	19	11	4	3	1	0
11	17	11	8	4	1	0
12	22	15	3	1	0	0
13	22	7	2	0	0	0
14	20	9	5	3	2	0
15	8	6	5	2	0	0
16	2	0	0	0	0	0
17	6	3	1	1	0	0
18	1	0	0	0	0	0
19	6	3	3	2	0	0
20	17	12	5	3	0	0
21	8	6	4	4	0	0
22	46	16	9	4	0	0
23	66	18	10	6	1	0
24	24	13	11	3	0	0
25	2	0	0	0	0	0
26	12	5	2	1	0	0
27	7	4	2	2	0	0
28	3	1	0	0	0	0
29	11	8	3	1	0	0
30	17	9	1	0	0	0
31	15	12	7	3	0	0
32	3	0	0	0	0	0
33	2	1	0	0	0	0
34	1	0	0	0	0	0
35	28	19	11	5	0	0
36	19	17	7	3	1	0
37	5	2	1	0	0	0
38	19	10	9	2	0	0
39	8	5	3	2	0	0
40	22	17	8	3	0	0
41	1	1	1	0	0	0
42	14	7	2	1	0	0

43	9	6	4	4	0	0
44	0	0	0	0	0	0
45	5	2	1	1	0	0
46	29	18	5	1	0	0
47	11	9	4	2	0	0
48	8	7	5	2	0	0
49	0	0	0	0	0	0
50	3	1	0	0	0	0
51	8	4	1	1	0	0
52	16	11	5	2	1	0
53	44	26	13	8	2	0
54	31	21	13	7	1	0
55	22	12	3	1	0	0
56	8	3	3	2	1	0
57	36	21	14	7	2	0
58	28	17	12	8	4	1
59	19	10	8	4	0	0
60	12	7	4	3	0	0
61	4	2	2	2	0	0
62	14	10	6	3	0	0
63	16	8	7	5	0	0
64	10	6	5	3	0	0
65	0	0	0	0	0	0
66	7	6	4	2	0	0
67	5	2	1	1	0	0
68	0	0	0	0	0	0
69	0	0	0	0	0	0
70	19	11	9	3	0	0
71	22	9	8	4	0	0
72	36	11	3	1	0	0
73	4	2	2	1	0	0
74	1	0	0	0	0	0
75	12	11	9	5	2	0
76	13	6	1	0	0	0
77	15	7	3	1	0	0
78	37	24	19	8	2	0
79	26	13	8	4	1	0
80	14	8	1	1	0	0
81	4	2	2	1	0	0
82	11	10	8	3	0	0
83	0	0	0	0	0	0
84	12	3	1	1	0	0
85	10	7	3	1	0	0
86	9	6	4	3	0	0
87	9	7	5	2	0	0
88	5	4	4	3	0	0

Average	10.58	5.68	3.06	1.16	0.15	0.01

calculations at 0.5

# of locations	88
Mean	2.03
Standard Deviation	2.02
Standard Error	0.22
UCL	N/A

calculations at 0.3

# of locations	88
Mean	4.08
Standard Deviation	3.92
Standard Error	0.42
UCL	N/A

calculations at 0.1

# of locations	88
Mean	13.36
Standard Deviation	12.10
Standard Error	1.29
UCL	N/A

calculations at 0.2

# of locations	88
Mean	7.44
Standard Deviation	6.28
Standard Error	0.67
UCL	N/A

calculations at 1.0

# of locations	88
Mean	0.24
Standard Deviation	0.67
Standard Error	0.07
UCL	N/A

calculations at 5.0

# of locations	88
Mean	0.01
Standard Deviation	0.12
Standard Error	0.01
UCL	N/A

EQUIPMENT CALIBRATION LIST

EQUIPMENT	MODEL#	SERIAL#	CALIB. DATE	NEXT CALIB.
PARTICLE COUNTER	P.M.S. uLPC-110	9409-0387-09	4/96	4/97