

Guidance for Physicians

**on Assessment of Medical Fitness to Use Respiratory Protection
in Conditions of High Roadside Air Pollution Index**

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1. INTRODUCTION

- 1.1 Starting from June 1998, the Environmental Protection Department (EPD), in addition to the General Air Pollution Index (API), reports and forecasts also the Roadside API. It gives an indication of the level of air pollution which is present in the outdoor environment. Very high levels of air pollution can cause symptoms in persons with no underlying disease, but persons who have health problems may be affected at lesser levels. Any person who is sick and unfit to work should take sick leave. For those who need to work on days with high air pollution, they may indicate a wish to use respiratory protection.
- 1.2 This Guidance Note is to assist physicians to assess the medical fitness of their patients or clients in using respiratory protection.

2. THE AIR POLLUTION INDEX

- 2.1 The Air Pollution Index (API) is a simple way of describing air pollution levels to provide timely information about air pollution to the public and to enhance awareness. It serves also as an alert to the public before the onset of serious air pollution episodes and helps the general public, especially susceptible groups such as those with heart or respiratory illnesses, to consider taking precautionary measures when necessary.
- 2.2 The API converts the measured pollution levels to a value ranging from 0 to 500 by referencing to the breakpoint values set out in the Appendix 1. Similar to the practice in other places to ensure proper protection of the public health, the EPD determines the indices for the five major pollutants and reports the highest as the API of the day. The most important API number is 100, since it corresponds to the health related Air Quality Objectives established under the Air Pollution Control Ordinance. An API level in excess of 100 means that one or more air pollutants are in the unhealthy range on a given day. People with existing heart or respiratory illnesses will notice mild aggravation of their health conditions while some healthy individuals may also notice some discomfort.
- 2.3 Since June 1995, the EPD has been reporting the daily ambient, or general, API and making a forecast for the following day. This information is reported in newspapers, on the radio and on television. It is also available from the API Hotline at 28278541 and, starting from mid-1998, at the EPD's website at <http://www.info.gov.hk/epd/>. Please refer to the EPD's leaflet entitled "Air Pollution Index and You" for further information.
- 2.4 To serve the community better, the EPD reports also the roadside API from June 1998. The levels of air pollution at urban roadsides with fairly heavy to very heavy traffic in areas surrounded by tall buildings are represented. The roadside API provides information on the level of pollution very close to vehicle emission sources. It will, therefore, naturally be higher than the general API on a given day. For most people, the roadside API will be less relevant as they spend only a short period of time each day in busy roads or streets. The index is of more interest to outdoor workers who need to spend several hours continuously each day in busy streets.

- 2.5 Despite the rigorous control efforts to combat air pollution, there may still be several days each year that the air pollution is poorer because of the continual increase of diesel vehicle mileage. On days with calm and stable meteorological conditions (mostly in winter months and a few occasions in summer when tropical cyclones are approaching), the air pollution may be built up to unhealthy levels. The occurrence of such air pollution episodes is low: about 3-5 days a year but busy roadsides will see more days with the API higher than 100.

3. USE OF RESPIRATORS

- 3.1 To alleviate the possible adverse health effects on days with poor air pollution, those who have existing respiratory or cardiovascular diseases should reduce strenuous outdoor activity. However, this is not often practicable for some outdoor workers. These people may, therefore, wish to use protective respirators. However, they must seek advice from physicians if they find difficulties or have doubt on their fitness to use these devices. Physicians, inter alia, can help them by assessing and advising on their fitness to work outdoors and to wear protective respirators.
- 3.2 Due to the continual control efforts, it is unlikely that severe air pollution incidents will occur. The use of light and disposable respirators with lower breathing resistance should often be sufficient for providing protection on days with high particulate pollution. For other more sophisticated respirators, while effective in filtering both gaseous and particulate air pollutants, they are uncomfortable and increase the effort of breathing.

4. EFFECTS OF RESPIRATOR USE

- 4.1 Wearing a respirator results in increased resistance to breathing and prolongs the duration of both the inspiratory and expiratory phases of respiration. The pressure flow characteristics of respirators are such that the resistance to flow increases as the flow rate increases. High flow rates such as those demanded by heavy exertion may be difficult or impossible to achieve while wearing a respirator, even though breathing is little affected at rest or during mild exertion. Reductions in arterial blood oxygen tensions and elevations in arterial blood carbon dioxide levels have been observed in normal subjects exercising while wearing respirators.
- 4.2 Persons with airflow obstruction (such as those suffering from chronic obstructive airways disease) have decreased expiratory flow rates and thus require more expiratory time in each breathing cycle to achieve the same tidal volume. As the respiratory rate increases, the relative time for inspiration is decreased, requiring a higher inspiratory flow rate. Thus for people with airflow obstruction, the effect on maximal voluntary ventilation (MVV) of using a respirator may be much greater than for persons with normal respiratory function. Some subjects with moderate COAD may be asymptomatic during exertion but this is not an accurate reflection of gas exchange alterations [1].

- 4.3 The additional dead space associated with a respirator may cause carbon dioxide retention at high work rates, especially in persons with suppressed respiratory drive. Use of respirators in conditions of high heat and humidity may cause additional stress.
- 4.4 Some studies have shown elevated heart rates while using respirators and others have demonstrated significantly elevated systolic pressure and more moderately elevated diastolic pressure associated with respirator use, both at rest and during exercise [2].

5 MEDICAL ASSESSMENT

5.1 There are no simple or universal criteria which can be given in order to decide on fitness to use a respirator under actual working conditions. The examining physician must use his medical judgement based on the following:

- The nature of the work
- The underlying pathology
- The physiological effects of respirator use.

5.2 The combination of these factors (and particularly the interaction of underlying pathology and altered physiology) will allow the examining physician to decide whether the patient can perform the required duties and whether the use of a respirator will lead to an exacerbation of the underlying condition.

5.3 The main conditions which raise doubt about the ability of workers to use respirators are respiratory and cardiovascular disease. It is the respiratory and cardiovascular systems which are primarily affected by high API itself.

(i) *Pulmonary Function*

5.4 A useful measure of pulmonary function is spirometry. The main causes of abnormal spirometry are obstructive and restrictive lung disorders. Those workers who have both Forced Vital Capacity (FVC) and Forced Expiratory Volume in 1 second (FEV_1) > 70% of that predicted for a person of the same sex, age, height and race (Appendix 2) and a ratio of FEV_1/FVC of > 65% will probably be able to tolerate the use of a respirator under moderate workloads [2].

5.5 Careful assessment of workers with asthma will be required. Factors to be taken into account include the severity and frequency of attacks and any triggering factors. Those with asthmatic attacks precipitated by non-specific factors or by exercise, cold air or stress are unlikely to be fit for respirator use.

5.6 Workers with past history of spontaneous pneumothorax may develop increased fluctuations in thoracic pressure while breathing with a respirator. The increased risk of barotrauma may be incompatible with the use of a respirator with relatively high resistance.

(ii) Cardiovascular Disorders

5.7 Those with cardiovascular disease must also be assessed carefully. A history of ischaemic heart disease, significant arrhythmia, severe hypertension or cerebrovascular accident may be incompatible with respirator use.

(iii) Allergic Skin Reactions

5.8 Allergic skin reactions may occur occasionally from wearing a respirator, and skin occlusion may cause irritation or exacerbation of pre-existing conditions such as pseudofolliculitis barbae. Facial discomfort from the pressure of the respirator may occur, particularly when the fit is unsatisfactory [3].

6. OTHERS

6.1 It must be emphasised that the above are guidelines only, and that each patient must be assessed on an individual basis. Some workers with impaired respiratory or cardiovascular functions are able to work safely while wearing respirators if they can control their own work pace, including sufficient time to rest.

References

- [1] Gee J B L, Burton G, Vassalo C, & Gregg J, "Effects of External Airway Obstruction on Work Capacity and Pulmonary Gas Exchange", *Am. Rev. Respir. Dis.*, 98, p.1003, 1968
- [2] Raven P B, Jackson A W, Page K, et al., "The Physiologic Responses of Mild Pulmonary Impaired Subjects while using a Demand Respirator during Rest and Work", *Am. Ind. Hyg. Assoc. J.*, 42, p.247, 1981
- [3] "National Institute of Occupational Safety and Health Respirator Decision Logic", U.S Government Printing Office, 1992

CALCULATION OF THE AIR POLLUTION INDEX

The Air Pollution Index (API) is based on the measurement of five air pollutants for which Hong Kong Air Quality Objectives (AQO) have been established. These pollutants are nitrogen dioxide, sulphur dioxide, ozone, carbon monoxide and respirable suspended particulates. They are measured at the air quality monitoring stations of the Environmental Protection Department.

The API is calculated by first computing the subindices of scale extending from 0 to 500 for the air pollutants based on the measured ambient 1-hour and 24-hour concentrations. Subindex levels were identified to relate ambient pollutant concentrations over a 24-hour period to potential health effects. A subindex level 100 corresponds to the short-term AQO below which there is no major acute health effects while an API level of 500 corresponds to significant harm to human health.

The API subindex levels and their corresponding concentrations for the measured parameters are presented in the following table.

API Sub-index	Relationship with the AQO	Concentration ($\mu\text{g}/\text{m}^3$)							
		RSP 24-h	SO ₂ 24-h	SO ₂ 1-h	NO ₂ 24-h	NO ₂ 1-h	CO 8-h	CO 1-h	O ₃ 1-h
0	--	0	0	0	0	0	0	0	0
25	50% of annual AQO or 25% of short-term AQO	27.5	40	200	40	75	2500	7500	60
50	Annual AQO or 50% of short-term AQO	55	80	400	80	150	5000	15000	120
100	Short-term AQO	180	350	800	150	300	10000	30000	240
200	--	350	800	1600	280	1130	17000	60000	400
300	--	420	1600	2400	565	2260	34000	90000	800
400	--	500	2100	3200	750	3000	46000	120000	1000
500	--	600	2620	4000	940	3750	57000	150000	1200

API sub-indices for each of these five pollutants are calculated and the highest number is reported as the API of the day.

FORCED VITAL CAPACITY (FVC) AND FORCED EXPIRATORY VOLUME IN 1 SECOND (FEV₁)

PREDICTED FVC FOR MALE

AGE	HEIGHT												
	60in 1.52m	61in 1.55m	62in 1.57m	63in 1.60m	64in 1.63m	65in 1.65m	66in 1.68m	67in 1.70m	68in 1.73m	69in 1.75m	70in 1.78m	71in 1.80m	72in 1.83m
15	307	318	329	341	352	364	375	387	398	410	421	433	444
16	314	326	337	349	361	373	384	396	408	420	431	443	455
17	321	333	344	356	368	380	392	404	416	428	440	452	464
18	326	339	351	363	375	387	399	412	424	436	448	461	473
19	331	344	356	369	381	394	406	418	430	443	455	468	480
20	336	349	361	374	386	399	411	424	436	449	461	474	486
21	339	352	365	378	390	403	415	428	441	454	466	479	492
22	343	356	368	381	394	407	419	432	445	458	471	484	496
23	345	358	371	384	397	410	423	436	448	461	474	487	500
24	347	360	373	386	399	412	425	438	451	464	477	490	503
25	349	362	375	388	401	414	427	440	453	466	479	492	505
26	350	363	376	389	402	415	428	442	455	468	481	494	507
27	351	369	377	390	403	416	429	443	456	469	482	495	508
28	351	364	377	391	404	417	430	443	456	469	482	496	509
29	351	364	377	391	404	417	430	443	456	469	482	496	509
30	351	364	377	390	403	416	429	443	456	469	482	495	508
31	350	363	376	389	402	416	429	442	455	468	481	494	507
32	349	362	375	388	401	414	427	441	454	467	480	493	506
33	348	361	374	387	400	413	426	439	452	465	478	491	504
34	347	360	372	385	398	411	424	437	450	463	476	489	502
35	345	358	371	384	396	409	422	435	448	461	474	487	499
36	343	356	368	381	394	407	420	433	445	458	471	484	497
37	341	354	366	379	392	405	417	430	443	456	468	481	494
38	339	352	364	377	389	402	414	427	440	453	465	478	490
39	336	349	361	374	386	399	411	424	436	449	462	475	487
40	333	346	358	371	383	396	408	421	433	446	458	471	483
41	331	343	355	368	380	393	405	417	429	442	454	467	479
42	328	340	352	365	377	389	401	414	426	438	450	463	475
43	325	337	349	361	373	385	397	410	422	434	446	458	470
44	321	333	345	357	369	381	393	406	418	430	442	454	466
45	318	330	342	354	366	378	389	401	413	425	437	449	461
46	315	327	338	350	362	374	385	397	409	421	432	444	456
47	311	323	335	347	358	370	381	393	404	416	428	440	451
48	308	320	331	343	354	366	377	389	400	412	423	435	446
49	304	316	327	339	350	361	372	384	395	407	418	430	441
50	301	312	323	334	345	357	368	379	390	402	413	424	435
51	297	308	319	330	341	352	363	375	386	397	408	419	430
52	293	304	315	326	337	348	359	370	381	392	403	414	425
53	289	300	311	322	333	344	354	365	376	387	398	409	419
54	286	297	307	318	328	339	350	361	371	382	392	403	414
55	282	293	303	314	324	335	345	356	366	377	387	398	408
56	278	289	299	309	319	330	340	351	361	372	382	392	402
57	274	284	294	305	315	325	335	346	356	366	376	387	397
58	270	280	290	300	310	321	331	341	351	361	371	381	391
59	266	276	286	296	306	316	326	336	346	356	366	376	386
60	262	272	282	292	301	311	321	331	341	351	360	370	380
61	258	268	278	288	297	307	316	326	336	346	355	365	374
62	255	264	273	283	292	302	311	321	331	341	350	360	369
63	251	260	269	279	288	298	307	316	325	335	344	354	363
64	247	256	265	274	283	293	302	311	320	330	339	348	357
65	243	252	261	270	279	288	297	306	315	325	334	343	352
66	239	248	257	266	275	284	292	301	310	319	328	337	346
67	235	244	253	262	270	279	288	297	305	314	323	332	341
68	231	240	248	257	266	275	283	292	300	309	318	327	335
69	228	236	244	253	261	270	278	287	295	304	312	321	329
70	224	232	240	249	257	266	274	283	291	299	307	316	324

PREDICTED FEV₁ FOR MALE

AGE	HEIGHT												
	60in 1.52m	61in 1.55m	62in 1.57m	63in 1.60m	64in 1.63m	65in 1.65m	66in 1.68m	67in 1.70m	68in 1.73m	69in 1.75m	70in 1.78m	71in 1.80m	72in 1.83m
15	282	293	304	315	326	337	348	359	370	381	392	403	414
16	289	300	311	322	333	345	356	367	378	390	401	412	423
17	295	306	317	329	340	352	363	374	385	397	408	420	431
18	299	311	322	334	345	357	369	381	392	404	415	427	438
19	303	315	327	339	350	362	374	386	397	409	421	433	444
20	307	319	330	342	354	366	378	390	401	413	425	437	449
21	310	322	333	345	357	369	381	393	405	417	429	441	453
22	312	324	336	348	360	372	384	396	408	420	432	444	456
23	313	325	337	349	361	374	386	398	410	422	434	447	459
24	314	326	338	351	363	375	387	399	411	424	436	448	460
25	315	327	339	351	363	376	388	400	412	425	437	449	461
26	315	327	339	351	363	376	388	400	412	425	437	449	461
27	315	327	339	351	363	376	388	400	412	424	436	449	461
28	314	326	338	350	362	375	387	399	411	424	436	448	460
29	313	325	337	349	361	374	386	398	410	422	434	447	459
30	312	324	336	348	360	372	384	396	408	420	432	445	457
31	310	322	334	346	358	370	382	394	406	418	430	442	454
32	308	320	332	344	356	368	380	392	404	416	428	440	452
33	306	318	330	342	353	365	377	389	401	413	425	437	449
34	304	316	327	339	351	363	374	386	398	410	422	434	445
35	301	313	325	337	348	360	371	383	395	407	418	430	441
36	299	311	322	334	345	357	368	380	391	403	414	426	437
37	296	307	318	330	341	353	364	376	387	399	410	422	433
38	293	304	315	327	338	349	360	372	383	395	406	418	429
39	290	301	312	323	334	345	356	368	379	390	401	413	424
40	286	297	308	319	330	341	352	364	375	386	397	408	419
41	283	294	304	315	326	337	348	359	370	381	392	403	414
42	279	290	301	312	322	333	344	355	365	376	387	398	409
43	276	287	297	308	318	329	339	350	361	372	382	393	403
44	272	283	293	304	314	325	335	346	356	367	377	388	398
45	268	278	288	299	309	320	330	341	351	361	371	382	392
46	264	274	284	295	305	315	325	336	346	356	366	377	387
47	260	270	280	290	300	310	320	330	340	351	361	371	381
48	256	266	276	286	296	306	315	325	335	345	355	365	375
49	252	262	272	282	291	301	310	320	330	340	350	360	369
50	248	258	267	277	286	296	306	316	325	335	344	354	363
51	244	254	263	273	282	292	301	310	319	329	338	348	357
52	240	249	258	268	277	287	296	305	314	324	333	342	351
53	236	245	254	263	272	282	291	300	309	318	327	336	345
54	232	241	250	259	268	277	286	295	304	313	322	331	340
55	228	237	245	254	263	272	281	290	298	307	316	325	334
56	224	233	241	250	258	267	276	285	293	302	310	319	328
57	220	229	237	245	253	262	271	280	288	297	305	314	322
58	216	224	232	241	249	258	266	274	282	291	299	308	316
59	212	220	228	236	244	253	261	269	277	285	293	302	310
60	208	216	224	232	240	248	256	264	272	280	288	296	304
61	204	212	219	227	235	243	251	259	267	275	282	290	298
62	200	208	215	223	230	238	246	254	261	269	277	285	292
63	196	204	211	219	226	234	241	249	256	264	272	280	287
64	192	200	207	214	221	229	236	244	251	259	266	274	281
65	188	196	203	210	217	225	232	239	246	254	261	268	275
66	184	191	198	206	213	220	227	234	241	249	256	263	270
67	181	188	194	201	208	215	222	229	236	243	250	257	264
68	177	184	190	197	204	211	218	225	231	238	245	252	259
69	173	180	186	193	200	207	213	220	227	234	240	247	254
70	170	177	183	190	196	203	209	216	222	229	235	242	248

PREDICTED FVC FOR FEMALE

AGE	HEIGHT												
	56in 1.42m	57in 1.45m	58in 1.47m	59in 1.50m	60in 1.52m	61in 1.55m	62in 1.57m	63in 1.60m	64in 1.63m	65in 1.65m	66in 1.68m	67in 1.70m	68in 1.73m
15	223	232	240	249	257	266	274	283	291	299	307	316	324
16	228	237	245	254	262	271	279	288	296	305	313	322	330
17	231	240	249	258	266	275	283	292	301	310	318	327	335
18	234	243	252	261	269	278	287	296	305	314	322	331	340
19	237	246	255	264	272	281	290	299	308	317	326	335	343
20	239	248	257	266	275	284	293	302	311	320	329	338	346
21	241	250	259	268	277	286	295	304	313	322	331	340	349
22	242	251	260	270	279	288	297	306	315	324	333	342	351
23	243	253	262	271	280	289	298	308	317	326	335	344	353
24	244	254	263	272	281	290	299	309	318	327	336	345	354
25	245	254	263	273	282	291	300	309	318	328	337	346	355
26	245	254	263	273	282	291	300	310	319	328	337	346	355
27	245	254	263	273	282	291	300	310	319	328	337	346	355
28	245	254	263	273	282	291	300	309	318	328	337	346	355
29	244	254	263	272	281	290	299	309	318	327	336	345	354
30	244	253	262	271	280	290	299	308	317	326	335	344	353
31	243	252	261	270	279	289	298	307	316	325	334	343	352
32	242	251	260	269	278	288	297	306	315	324	333	342	351
33	241	250	259	268	277	286	295	304	313	322	331	340	349
34	240	249	258	267	276	285	294	303	312	321	330	339	347
35	238	247	256	265	274	283	292	301	310	319	328	337	345
36	237	246	254	263	272	281	290	299	308	317	325	334	343
37	235	244	253	262	270	279	288	297	306	315	323	332	341
38	233	242	251	260	268	277	286	295	303	312	321	330	338
39	231	240	249	258	266	275	284	293	301	310	318	327	336
40	229	238	247	256	264	273	281	290	299	308	316	325	333
41	227	236	245	254	262	271	279	288	296	305	313	322	330
42	225	234	242	251	259	268	276	285	293	302	310	319	327
43	223	232	240	249	257	266	274	282	290	299	307	316	324
44	221	230	238	246	254	263	271	280	288	296	304	313	321
45	219	227	235	244	252	260	268	277	285	293	301	309	317
46	217	225	233	241	249	257	265	274	282	290	298	306	314
47	214	222	230	238	246	255	263	271	279	287	295	303	310
48	212	220	228	236	244	252	260	268	276	284	291	299	307
49	209	217	225	233	241	249	257	265	272	280	288	296	304
50	207	215	222	230	238	246	254	262	269	277	285	293	300
51	204	212	220	228	235	243	251	259	266	274	281	289	296
52	202	210	217	225	232	240	248	256	263	271	278	286	293
53	199	207	214	222	229	237	244	252	259	267	274	282	289
54	197	205	212	220	227	234	241	249	256	264	271	278	285
55	194	202	209	217	224	231	238	246	253	260	267	275	282
56	192	199	206	214	221	228	235	242	249	257	264	271	278
57	189	196	203	211	218	225	232	239	246	253	260	267	274
58	187	194	201	208	215	222	229	236	243	250	257	264	271
59	184	191	198	205	212	219	226	233	239	246	253	260	267
60	181	188	195	202	209	216	222	229	236	243	250	257	263
61	179	186	192	199	206	213	219	226	233	240	246	253	259
62	176	183	190	197	203	210	216	223	229	236	243	250	256
63	174	181	187	194	200	207	213	220	226	233	239	246	252
64	171	178	184	191	197	204	210	217	223	230	236	242	248
65	169	175	181	188	194	201	207	213	219	226	232	239	245
66	166	173	179	185	191	198	204	210	216	223	229	235	241
67	164	170	176	182	188	195	201	207	213	219	225	231	237
68	161	167	173	179	185	192	198	204	210	216	222	228	234
69	159	165	171	177	183	189	194	200	206	212	218	224	230
70	156	162	168	174	180	186	191	197	203	209	215	221	226

PREDICTED FEV₁ FOR FEMALE

AGE	HEIGHT												
	56in 1.42m	57in 1.45m	58in 1.47m	59in 1.50m	60in 1.52m	61in 1.55m	62in 1.57m	63in 1.60m	64in 1.63m	65in 1.65m	66in 1.68m	67in 1.70m	68in 1.73m
15	208	217	225	233	241	249	257	265	273	282	290	298	306
16	212	220	228	237	245	253	261	270	278	286	294	303	311
17	214	223	231	240	248	256	264	273	281	290	298	307	315
18	216	225	233	242	250	259	267	276	284	293	301	310	318
19	218	227	235	244	252	261	269	278	286	295	303	312	320
20	220	229	237	246	254	263	271	280	288	297	305	314	322
21	220	229	238	247	255	264	272	281	289	298	307	316	324
22	221	230	238	247	256	265	273	282	290	299	307	316	325
23	221	230	239	248	256	265	273	282	291	300	308	317	325
24	221	230	239	248	256	265	273	282	291	300	308	317	325
25	221	230	238	247	256	265	273	282	290	299	308	317	325
26	221	230	238	247	255	264	272	281	290	299	307	316	324
27	220	229	237	246	254	263	271	280	289	298	306	315	323
28	219	228	236	245	253	262	270	279	287	296	305	314	322
29	218	227	235	244	252	261	269	278	286	295	303	312	320
30	217	225	233	242	250	259	267	276	284	293	301	310	318
31	215	224	232	241	249	258	266	274	282	291	299	308	316
32	214	222	230	239	247	256	264	272	280	289	297	306	314
33	212	220	228	237	245	253	261	270	278	287	295	303	311
34	210	218	226	235	243	251	259	268	276	284	292	300	308
35	208	216	224	232	240	249	257	265	273	281	289	297	305
36	206	214	222	230	238	246	254	262	270	278	286	294	302
37	204	212	220	228	236	244	252	260	268	276	283	291	299
38	202	210	217	225	233	241	249	257	265	273	280	288	296
39	199	207	215	223	230	238	246	254	262	270	277	285	293
40	197	205	212	220	228	236	243	251	259	267	274	282	289
41	195	203	210	218	225	233	240	248	255	263	270	278	286
42	192	200	207	215	222	230	237	245	252	260	267	275	282
43	190	197	204	212	219	227	234	242	249	257	264	271	278
44	187	195	202	209	216	224	231	238	245	253	260	268	275
45	184	192	199	206	213	221	228	235	242	249	256	264	271
46	182	189	196	203	210	217	224	232	239	246	253	260	267
47	179	186	193	200	207	214	221	228	235	242	249	256	263
48	177	184	190	197	204	211	218	225	232	239	245	252	259
49	174	181	187	194	201	208	215	222	228	235	242	249	255
50	171	178	185	192	198	205	211	218	225	232	238	245	251
51	169	176	182	189	195	202	208	215	221	228	234	241	247
52	166	173	179	186	192	199	205	212	218	225	231	238	244
53	163	170	176	183	189	195	201	208	214	221	227	234	240
54	161	167	173	180	186	192	198	205	211	217	223	230	236
55	158	164	170	176	182	189	195	201	207	213	219	226	232
56	155	161	167	173	179	186	192	198	204	210	216	222	228
57	153	159	164	170	176	182	188	194	200	206	212	218	224
58	150	156	162	168	173	179	185	191	197	203	208	214	220
59	147	153	159	165	170	176	182	188	193	199	205	211	216
60	145	151	156	162	167	173	179	185	190	196	201	207	212
61	142	148	153	159	164	170	175	181	187	193	198	204	209
62	140	145	150	156	161	167	172	178	183	189	194	200	205
63	137	143	148	153	158	164	169	175	180	186	191	196	201
64	134	140	145	150	155	161	166	172	177	182	187	192	197
65	132	137	142	148	153	158	163	168	173	179	184	189	194
66	130	135	140	145	150	155	160	165	170	175	180	185	190
67	127	132	137	142	147	152	157	162	167	172	177	182	187
68	125	130	134	139	144	149	154	159	164	169	173	178	183
69	122	127	132	137	141	146	151	156	160	165	170	175	180
70	120	125	129	134	139	144	148	153	157	162	167	172	176