



Southwest Fireproofing™ Type 5GP™, Type 5MD™ & Type 5AR™ Injection Procedures for High Production

Mixing Procedures

Obtaining Target Mixer Density:

- Mix Type 5GP, Type 5AR or Type 5MD as directed on the product data sheet.
- Obtaining the correct mix of water into the material is critical for achieving the optimum board foot yield.
- Longer mixing times will reduce mixer density.
- To measure density, use a 1 liter plastic container, place on scale and zero/tare container.
- Fill container to the top with material. Strike flush with the top of container. Weigh container.
- Ensure material is within target mixer density range (see chart below). If weight is low, mix material for a shorter time or slow down mixer speed. If weight is high, mix material for a longer time or increase mixer speed. Field adjustments may be required to compensate for site conditions.
- Mixer density is only used as a guideline to ensure to proper consistency of the material to ensure the material can flow and pump properly.
- Improper mixing can lead to low densities that will may violate the UL minimum dry density for the product. High densities may reduce yield of material.

Product	SW Type 5GP™	SW Type 5MD™	SW Type 5AR™
Water Level	10-11 gallons	8-10 gallons	11-13 gallons
Mix Time	1.5 – 2 minutes	1.5 – 2 minutes	1.5 – 2 minutes
Mix Speed	40 RPM	40 RPM	40 RPM
Target Mixer Density	705-769 g/l (44-48 pcf)	736-784 g/l (46-49 pcf)	705-769 g/l (44-48 pcf)

Note: The mixer density should be used as a starting point and should not be used to directly predict the dry density of the material. Many influences can affect the final nozzle density. Good measurement at the nozzle will incorporate all the influencing factors between the mixer and the substrate.

Note: SW Type 5AR™ is an extended set, spray applied fire resistive material that can be left in the equipment and lines for up to 4 days without setting. It was developed to be used as a holding material to leave in the equipment and lines to reduce start up and clean up times when using the Southwest Type 5 materials. This material requires injection with Accelerator A-20 to reach final set. It is intended for use with Southwest Type 5GP and Southwest Type 5MD for application to interior structural columns, beams, joists, decks, walls, roofs, girders, floors and pre-cast concrete units.

Nozzle/Gun Set Up

Nozzle Gun

- Use a minimum 1" I.D. plaster type nozzle with shut off valve, swivel and air shut off valve.

Orifice Size and Shields

- 9/16" to 5/8". The slower the pumping rate the smaller the orifice size must be to maintain a good spray pattern. Use minishields or supershields depending on project conditions.

Air Requirements

- Compressor on pump must be capable of maintaining a minimum of 30 psi and 9 to 11 cfm at the nozzle (optimal yield is achieved at 15 psi). Airline must be a minimum of 5/8" I.D. with minimum burst pressure of 100 psi (3/4" is optimal).

Accelerator A-20 Injection Procedures

Equipment Set Up

- Set up mixer, hoses and spray pump per the application instructions in the Southwest fireproofing product data sheet. 15 – 25 foot of 1" to 1¼" I.D. whip hose should be used.
- Set up the recommended Accelerator A-20 injection equipment. Use Injector Unit with one or two 55 gallon plastic drums, 110V electric agitators to stir the solution, and 110V electric injection pump to move Accelerator A-20 solution through 3/8 inch hose to the injector housing on the material hose. Injector pump is controlled by an on/off toggle switch and pump rate by a dial valve. Dial valve has rates in percentages (0 – 100%). Tanks and pump are mounted on a pushcart.
- Run the injection hose from the pump to the injection housing. The attachments should be made with quick disconnect fittings. Attach the injection housing at the start of the whip hose. The Accelerator A-20 solution needs a minimum of 15 – 25 feet of hose to mix with the gypsum based fireproofing before spraying through the nozzle. Injector housing is a 2" long 1" diameter pipe with a ½" diameter pipe feeding in at a 45° angle. It attaches to the whip hose by cup locks or cam lock fittings. The injection housing is attached to the material hose 15' to 25' back from the nozzle (This depends on the length of the whip hose). A backflow valve on the housing prevents material from pushing back into the injection hose. A shut off valve upstream or prior to the backflow valve is used to turn off the Accelerator A-20 solution flow through the injector housing.

Mixing of Accelerator A-20 Solution

- CAUTION: The Accelerator A-20 solution is acidic and can irritate or injure skin, eyes and lungs. All personnel should wear proper protection when mixing or spraying with Accelerator A-20. Glove, coveralls, respirator and goggles are required to avoid injury. Avoid contact to bare skin. The fumes from the Accelerator A-20 solution are irritating. Review Accelerator A-20 MSDS prior to use.
- Mix one 50 lbs. bag of Accelerator A-20 with 10.0 gallons of clean potable water. The standard mix is four bags of Accelerator A-20 with 40 gallons of water. The total solution volume will be 51 gallons.
- Continue mixing until Accelerator A-20 powder is dissolved completely. A longer mix time will be required to dissolve Accelerator A-20 in colder temperatures. After mixing, allow bubbles to come out of the solution.
- Open valve at base of tank to allow solution to flow to the injector pump. Close valve to injection hose. Open bypass valve and turn on injector pump to re-circulate Accelerator A-20 solution back into the mixing tank for 5 minutes.

- The Accelerator A-20 solution concentration can be checked with a hydrometer or by weight of a known volume. By hydrometer measurement, the target specific gravity is 1.245 with range of 1.235 to 1.255. To check by net weight of a filled container, a full 1 liter container should weigh 1245 grams ± 10 grams.
- Next, fill the alum hose with solution. Close the valve on the end of the hose near the injection housing. Close the bypass valve and open the injector pump valve to alum hose. With the end of the alum hose going back into the mixing tank, open the valve to allow solution to flow through the hose. Continue pumping back into the tank until all air bubbles are out of the hose.

Injection Flow Rates

- To determine the proper Accelerator A-20 flow rate, it is necessary to calculate the Type 5GP, Type 5MD or Type 5AR pumping rate in bags per hour.
- Use the following procedure to calculate the material pumping rate:
- Mix 2 bags of material per the data sheet instructions. Check the wet mixer density using the procedures given in the instructions above using 1 liter container.
- Spray the material without injecting Accelerator A-20 on the steel. Spray material until the hopper is almost completely empty. Next, mix another 2 bag batch of Type 5GP, Type 5MD or Type 5AR. Time the spraying of these two bags until the hopper is almost completely empty again to the same point.
Calculate the pumping rate with this formula: $(2 \text{ bags}) \times 60 = \# \text{ of bags per hour}$
 (time in minutes)
- Once the pumping rate has been calculated, use the following charts to set the injector pump to the optimum percentage flow rate of Accelerator A-20 to obtain the desired dry density of injected product. Injection flow rate must not exceed the recommended rate. If material is over injected, the dry densities will fall below the minimum required by the UL design.

Note: The following flow rates should be used as starting rates which will require adjustments based on the sprayed density measurements at the nozzle and dry density estimates.

Accelerator A-20 flow rate for 15 pcf dry density.

Set the alum pump to the flow rate required for the bag application rate. Check the alum flow rate by the time required to fill a 5 oz. Dixie cup or a 1 liter container. Pump settings for the alum Injector are approximate and can vary with different models or manufacturers. Pump settings can vary with wear on the equipment.

Bags/hr	A-20 flow (ml/min)	Accelerator A-20 Flow Rate		
		Seconds to fill 5 oz. cup	Seconds to fill 1 liter cup	Alum Pump Setting (%)
5	219	48	318	5
10	437	20	129	14
15	656	13	84	24
20	875	10	63	33
25	1093	8	51	43
30	1312	7	43	52
35	1531	6	38	62
40	1750	5	33	71
45	1968	5	30	81

A-20 flow rate for 17 pcf dry density.

Set the alum pump to the flow rate required for the bag application rate. Check the Accelerator A-20 flow rate by the time required to fill a 5 oz. Dixie cup or a 1 liter container. Pump settings for the alum Injector are approximate and can vary with different models or manufacturers. Pump settings can vary with wear on the equipment.

Bags/hr	A-20 flow (ml/min)	Accelerator A-20 Flow Rate		
		Seconds to fill 5 oz. cup	Seconds to fill 1 liter cup	Alum Pump Setting (%)
5	119	244	1637	1
10	239	42	278	6
15	358	25	163	11
20	478	18	117	16
25	597	14	93	21
30	716	12	77	27
35	836	10	66	32
40	955	9	58	37
45	1075	8	52	42

Checking Accelerator A-20 Flow Rates

- Before application, always check for wear on the injection pump and perform proper maintenance.
- With the injection hose disconnected from the injection housing, allow hose to flow into mixing tank. Time the filling of a 5 oz, dixie cup or 1 liter container at a particular setting on the injection pump.
- Compare the filling time to the chart below for the particular setting on the injection pump. If the time needed to fill the container is more than 10% greater than the time listed, the injection pump needs to be repaired.
- Always check the injection cartridge and housing daily. Inspect the tip for wear. If the tip has become rounded it must be replaced. All check valves must be inspected. If it is found that a check valve is faulty or clogged, it must be replaced.
- Check injection pump oil daily. Refill if necessary.

Accelerator Flow Rates

Injection Pump Setting (%)	Time To Fill 5 oz. Cup With A-20 Solution (Seconds)	Time To Fill 1 Liter Cup With A-20 Solution (Seconds)
10	27.0	177
20	15.0	98
30	10.7	69
40	8.4	54
50	6.9	45
60	5.9	38
70	5.2	34
80	4.7	30
90	4.2	27
100	3.9	25

Spraying Injected Type 5GP / Type 5MD / Type 5AR

- With the injection pump off and the valve at the end of the injection hose closed, reattach the injection hose to the injection housing. Turn the injection pump on.
- The worker who moves the hoses for the sprayer will control the injection hose valve at the injection housing. The valve will be opened and closed as required by the sprayer to inject the Accelerator A-20 solution into the material only when the material is flowing through the whip hose. If the valve is left open when material is stationary in the whip hose, the material will set up and harden in the line. The injection hose valve should be closed first whenever practical.
- Begin Spraying the Type 5GP, Type 5 MD or Type 5AR. Open the valve to start injection. When injected material sprays out of the nozzle, the material will darken and appear slightly thicker.
- Spray the injected material up to 1/2" thickness on the first coat. Apply additional coats of up to 3/4" over set coats.
- Allow 20 minutes for the material to set between coats. Colder temperatures will require more time. Material must be set and firm before receiving the next coat.
- Whenever the sprayer stops or turns off the material pump, the injection valve must be closed immediately. If spraying will stop for more than 2 minutes, the injected material in the whip hose must be cleared to prevent the material from setting in the hose. The material will begin setting as soon as it is injected with Accelerator A-20. If the material is not cleared it will harden in the hose and nozzle. Close the injection valve but continue to spray material until all of the injected material has cleared the nozzle (color will lighten and material will appear thinner). If stopping for more than 5 minutes, the injection pump must also be switched off at the motor.

Obtaining Target Nozzle Density:

- While spraying the injected SW Type 5 materials, it is necessary to check the wet density at the nozzle to insure you will have the proper corresponding dry density.
- The first step is to determine what nozzle density will deliver the approximate desired dry density and coverage given the amount of water used per bag. This is taken from the Estimated Density & Coverage charts for the specific material being used.
- The second step is to adjust the nozzle air stem position and air stem valve to deliver the required spray pattern at the lowest practical air flow.
- The third step is to determine the nozzle density at the starting injection rate. To do this, spray about 4" of material onto a board or shovel while moving the nozzle to insure a blend of all parts of the spray pattern. Nozzle should be kept at the same distance as when spraying onto steel.
- Use a spatula to immediately fill a 1 liter or 5 oz. cup. Fill container to the top with the Type 5 material. Strike flush with the top of container.
- Allow material to reach full expansion (5 minutes), then strike flush with top of container to remove material that has expanded beyond the rim of container.
- Weigh an empty 1 liter or 5 oz. cup and record the weight, or tare the scale.
- Weigh the sprayed sample in grams and subtract the weight of the cup to obtain net weight of the material in grams. The target nozzle weights should be as follows:

Product	SW Type 5GP™	SW Type 5MD™	SW Type 5AR™
Water Level Used	10-11 gallons	8-10 gallons	11-13 gallons
Target Nozzle Density (Estimated Dry Density)	577-625 g/l (15 pcf)	513-577 g/l (15 pcf) 545-609 g/l (16.5 pcf) 721-817 g/l (22 pcf)	577-625 g/l (15 pcf)

- Use conversion factor for the container used to calculate wet nozzle density in lbs./ft³ (pcf).
 - For 1 Liter containers: **(Sample weight in grams) x (0.0624) = wet nozzle density in lbs/ft³**
 - For 5 oz. containers: **(Sample weight in grams) x (0.421) = wet nozzle density in lbs/ft³**
- The fourth step is to adjust the Accelerator A-20 flow rate to increase or decrease the nozzle density as required to hit the target density under the project conditions.
- Repeat the measurement and make adjustments as necessary.
- Use the tables below to determine the dry density and coverage of the material sprayed.

Southwest Type 5GP™ Theoretical Density & Coverage Chart

Water/bag (gal.)		9.75		10.00		10.25		10.50		10.75		11.00		11.25		11.50		12.00		12.50	
Wet Den. (pcf)	Wgt L cup (gm.)	Dry Den. (pcf)	Bd. Ft. Cov.	Dry Den. (pcf)	Bd. Ft. Cov.	Dry Den. (pcf)	Bd. Ft. Cov.	Dry Den. (pcf)	Bd. Ft. Cov.	Dry Den. (pcf)	Bd. Ft. Cov.	Dry Den. (pcf)	Bd. Ft. Cov.	Dry Den. (pcf)	Bd. Ft. Cov.	Dry Den. (pcf)	Bd. Ft. Cov.	Dry Den. (pcf)	Bd. Ft. Cov.	Dry Den. (pcf)	Bd. Ft. Cov.
32	513	13.6	49.2	13.4	50.0	13.2	50.8	13.0	51.6	12.8	52.4	12.6	53.2	12.5	53.9	12.3	54.7	11.9	56.3	11.6	57.8
33	529	14.1	47.8	13.9	48.5	13.6	49.3	13.4	50.0	13.2	50.8	13.0	51.5	12.8	52.3	12.7	53.1	12.3	54.6	12.0	56.1
34	545	14.5	46.3	14.3	47.1	14.1	47.8	13.8	48.6	13.6	49.3	13.4	50.0	13.2	50.8	13.0	51.5	12.7	53.0	12.3	54.4
35	561	14.9	45.0	14.7	45.7	14.5	46.5	14.2	47.2	14.0	47.9	13.8	48.6	13.6	49.3	13.4	50.0	13.1	51.5	12.7	52.9
36	577	15.4	43.8	15.1	44.5	14.9	45.2	14.7	45.9	14.4	46.6	14.2	47.2	14.0	47.9	13.8	48.6	13.4	50.0	13.1	51.4
37	593	15.8	42.6	15.5	43.3	15.3	43.9	15.1	44.6	14.8	45.3	14.6	46.0	14.4	46.6	14.2	47.3	13.8	48.7	13.4	50.0
38	609	16.2	41.5	16.0	42.1	15.7	42.8	15.5	43.4	15.2	44.1	15.0	44.8	14.8	45.4	14.6	46.1	14.2	47.4	13.8	48.7
39	625	16.6	40.4	16.4	41.0	16.1	41.7	15.9	42.3	15.6	43.0	15.4	43.6	15.2	44.3	15.0	44.9	14.6	46.2	14.2	47.5
40	641	17.1	39.4	16.8	40.0	16.5	40.6	16.3	41.3	16.0	41.9	15.8	42.5	15.6	43.1	15.4	43.8	14.9	45.0	14.5	46.3
41	657	17.5	38.4	17.2	39.0	16.9	39.7	16.7	40.3	16.4	40.9	16.2	41.5	16.0	42.1	15.7	42.7	15.3	43.9	14.9	45.1
42	673	17.9	37.5	17.6	38.1	17.4	38.7	17.1	39.3	16.8	39.9	16.6	40.5	16.4	41.1	16.1	41.7	15.7	42.9	15.2	44.1
43	689	18.3	36.6	18.1	37.2	17.8	37.8	17.5	38.4	17.2	39.0	17.0	39.6	16.7	40.1	16.5	40.7	16.0	41.9	15.6	43.0
44	705	18.8	35.8	18.5	36.4	18.2	37.0	17.9	37.5	17.6	38.1	17.4	38.7	17.1	39.2	16.9	39.8	16.4	40.9	16.0	42.1
45	721	19.2	35.0	18.9	35.6	18.6	36.1	18.3	36.7	18.0	37.2	17.8	37.8	17.5	38.4	17.3	38.9	16.8	40.0	16.3	41.1
46	737	19.6	34.3	19.3	34.8	19.0	35.3	18.7	35.9	18.4	36.4	18.2	37.0	17.9	37.5	17.7	38.1	17.2	39.2	16.7	40.2
47	753	20.0	33.5	19.7	34.1	19.4	34.6	19.1	35.1	18.8	35.7	18.6	36.2	18.3	36.7	18.0	37.3	17.5	38.3	17.1	39.4
48	769	20.5	32.8	20.1	33.4	19.8	33.9	19.5	34.4	19.2	34.9	19.0	35.4	18.7	36.0	18.4	36.5	17.9	37.5	17.4	38.6
49	785	20.9	32.2	20.6	32.7	20.3	33.2	19.9	33.7	19.6	34.2	19.4	34.7	19.1	35.2	18.8	35.7	18.3	36.8	17.8	37.8
50	801	21.3	31.5	21.0	32.0	20.7	32.5	20.4	33.0	20.0	33.5	19.8	34.0	19.5	34.5	19.2	35.0	18.7	36.0	18.2	37.0
51	817	21.7	30.9	21.4	31.4	21.1	31.9	20.8	32.4	20.5	32.9	20.1	33.4	19.9	33.8	19.6	34.3	19.0	35.3	18.5	36.3
52	833	22.2	30.3	21.8	30.8	21.5	31.3	21.2	31.7	20.9	32.2	20.5	32.7	20.2	33.2	20.0	33.7	19.4	34.6	18.9	35.6
53	849	22.6	29.7	22.2	30.2	21.9	30.7	21.6	31.1	21.3	31.6	20.9	32.1	20.6	32.6	20.3	33.0	19.8	34.0	19.2	34.9
54	865	23.0	29.2	22.7	29.6	22.3	30.1	22.0	30.6	21.7	31.0	21.3	31.5	21.0	32.0	20.7	32.4	20.1	33.4	19.6	34.3
55	881	23.5	28.7	23.1	29.1	22.7	29.6	22.4	30.0	22.1	30.5	21.7	30.9	21.4	31.4	21.1	31.8	20.5	32.7	20.0	33.7
56	897	23.9	28.1	23.5	28.6	23.1	29.0	22.8	29.5	22.5	29.9	22.1	30.4	21.8	30.8	21.5	31.3	20.9	32.2	20.3	33.1
57	913	24.3	27.6	23.9	28.1	23.6	28.5	23.2	29.0	22.9	29.4	22.5	29.8	22.2	30.3	21.9	30.7	21.3	31.6	20.7	32.5
58	929	24.7	27.2	24.3	27.6	24.0	28.0	23.6	28.5	23.3	28.9	22.9	29.3	22.6	29.8	22.3	30.2	21.6	31.1	21.1	31.9
59	946	25.2	26.7	24.8	27.1	24.4	27.6	24.0	28.0	23.7	28.4	23.3	28.8	23.0	29.3	22.6	29.7	22.0	30.5	21.4	31.4
60	962	25.6	26.3	25.2	26.7	24.8	27.1	24.4	27.5	24.1	27.9	23.7	28.3	23.4	28.8	23.0	29.2	22.4	30.0	21.8	30.9

Areas highlighted in orange are below the minimum 15 pcf dry density.

Southwest Type 5MD™ Theoretical Density & Coverage Chart

Water/bag (gal.)		8.00		8.25		8.50		8.75		9.00		9.25		9.50		9.75		10.00		10.25		10.50	
Wet Den. (pcf)	Wgt L cup (gm.)	Dry Den. (pcf)	Bd. Ft. Cov.	Dry Den. (pcf)	Bd. Ft. Cov.	Dry Den. (pcf)	Bd. Ft. Cov.	Dry Den. (pcf)	Bd. Ft. Cov.	Dry Den. (pcf)	Bd. Ft. Cov.	Dry Den. (pcf)	Bd. Ft. Cov.	Dry Den. (pcf)	Bd. Ft. Cov.	Dry Den. (pcf)	Bd. Ft. Cov.	Dry Den. (pcf)	Bd. Ft. Cov.	Dry Den. (pcf)	Bd. Ft. Cov.	Dry Den. (pcf)	Bd. Ft. Cov.
32	513	15.9	43.8	15.6	44.6	15.4	45.3	15.1	46.1	14.8	46.9	14.6	47.7	14.4	48.5	14.1	49.2	13.9	50.0	13.7	50.8	13.5	51.6
33	529	16.4	42.4	16.1	43.2	15.8	44.0	15.6	44.7	15.3	45.5	15.1	46.2	14.8	47.0	14.6	47.8	14.3	48.5	14.1	49.3	13.9	50.0
34	545	16.9	41.2	16.6	41.9	16.3	42.7	16.0	43.4	15.8	44.1	15.5	44.9	15.3	45.6	15.0	46.3	14.8	47.1	14.6	47.8	14.3	48.6
35	561	17.4	40.0	17.1	40.7	16.8	41.4	16.5	42.2	16.2	42.9	16.0	43.6	15.7	44.3	15.5	45.0	15.2	45.7	15.0	46.5	14.8	47.2
36	577	17.9	38.9	17.6	39.6	17.3	40.3	17.0	41.0	16.7	41.7	16.4	42.4	16.2	43.1	15.9	43.8	15.7	44.5	15.4	45.2	15.2	45.9
37	593	18.4	37.9	18.1	38.5	17.8	39.2	17.5	39.9	17.2	40.6	16.9	41.2	16.6	41.9	16.3	42.6	16.1	43.3	15.8	43.9	15.6	44.6
38	609	18.9	36.9	18.6	37.5	18.2	38.2	17.9	38.8	17.6	39.5	17.3	40.2	17.1	40.8	16.8	41.5	16.5	42.1	16.3	42.8	16.0	43.4
39	625	19.4	35.9	19.0	36.6	18.7	37.2	18.4	37.8	18.1	38.5	17.8	39.1	17.5	39.8	17.2	40.4	17.0	41.0	16.7	41.7	16.4	42.3
40	641	19.9	35.0	19.5	35.6	19.2	36.3	18.9	36.9	18.6	37.5	18.2	38.1	18.0	38.8	17.7	39.4	17.4	40.0	17.1	40.6	16.9	41.3
41	657	20.4	34.2	20.0	34.8	19.7	35.4	19.3	36.0	19.0	36.6	18.7	37.2	18.4	37.8	18.1	38.4	17.8	39.0	17.6	39.7	17.3	40.3
42	673	20.9	33.3	20.5	33.9	20.2	34.5	19.8	35.1	19.5	35.7	19.2	36.3	18.9	36.9	18.6	37.5	18.3	38.1	18.0	38.7	17.7	39.3
43	689	21.4	32.6	21.0	33.2	20.6	33.7	20.3	34.3	19.9	34.9	19.6	35.5	19.3	36.1	19.0	36.6	18.7	37.2	18.4	37.8	18.1	38.4
44	705	21.9	31.8	21.5	32.4	21.1	33.0	20.8	33.5	20.4	34.1	20.1	34.7	19.7	35.2	19.4	35.8	19.1	36.4	18.8	37.0	18.6	37.5
45	721	22.4	31.1	22.0	31.7	21.6	32.2	21.2	32.8	20.9	33.3	20.5	33.9	20.2	34.5	19.9	35.0	19.6	35.6	19.3	36.1	19.0	36.7
46	737	22.9	30.4	22.5	31.0	22.1	31.5	21.7	32.1	21.3	32.6	21.0	33.2	20.6	33.7	20.3	34.3	20.0	34.8	19.7	35.3	19.4	35.9
47	753	23.4	29.8	22.9	30.3	22.5	30.9	22.2	31.4	21.8	31.9	21.4	32.5	21.1	33.0	20.8	33.5	20.4	34.1	20.1	34.6	19.8	35.1
48	769	23.9	29.2	23.4	29.7	23.0	30.2	22.6	30.7	22.3	31.3	21.9	31.8	21.5	32.3	21.2	32.8	20.9	33.4	20.5	33.9	20.2	34.4
49	785	24.3	28.6	23.9	29.1	23.5	29.6	23.1	30.1	22.7	30.6	22.4	31.1	22.0	31.6	21.6	32.2	21.3	32.7	21.0	33.2	20.7	33.7
50	801	24.8	28.0	24.4	28.5	24.0	29.0	23.6	29.5	23.2	30.0	22.8	30.5	22.4	31.0	22.1	31.5	21.7	32.0	21.4	32.5	21.1	33.0
51	817	25.3	27.5	24.9	28.0	24.5	28.4	24.1	28.9	23.7	29.4	23.3	29.9	22.9	30.4	22.5	30.9	22.2	31.4	21.8	31.9	21.5	32.4
52	833	25.8	26.9	25.4	27.4	24.9	27.9	24.5	28.4	24.1	28.9	23.7	29.3	23.3	29.8	23.0	30.3	22.6	30.8	22.3	31.3	21.9	31.7
53	849	26.3	26.4	25.9	26.9	25.4	27.4	25.0	27.8	24.6	28.3	24.2	28.8	23.8	29.3	23.4	29.7	23.0	30.2	22.7	30.7	22.3	31.1
54	865	26.8	25.9	26.4	26.4	25.9	26.9	25.5	27.3	25.0	27.8	24.6	28.3	24.2	28.7	23.9	29.2	23.5	29.6	23.1	30.1	22.8	30.6
55	881	27.3	25.5	26.9	25.9	26.4	26.4	25.9	26.8	25.5	27.3	25.1	27.7	24.7	28.2	24.3	28.7	23.9	29.1	23.5	29.6	23.2	30.0
56	897	27.8	25.0	27.3	25.5	26.9	25.9	26.4	26.4	26.0	26.8	25.5	27.2	25.1	27.7	24.7	28.1	24.3	28.6	24.0			