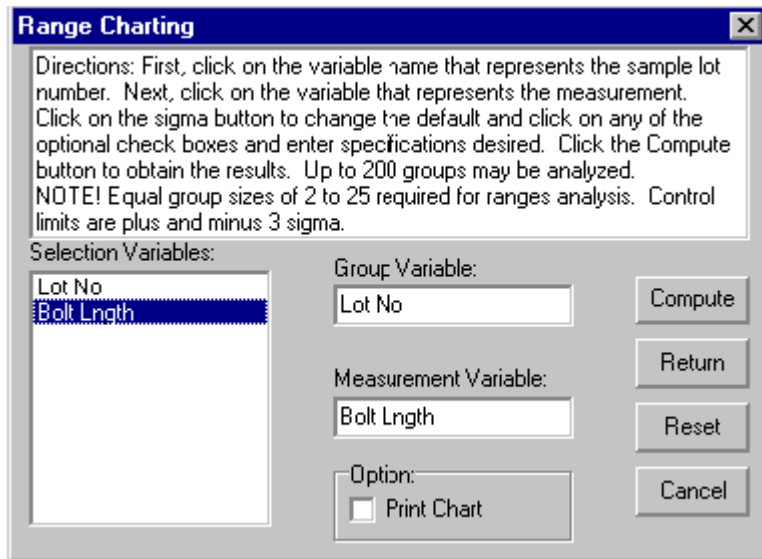


Range Chart

As tools wear the products produced may begin to vary more and more widely around the values specified for them. The mean of a sample may still be close to the specified value but the range of values observed may increase. The result is that more and more parts produced may be under or over the specified value. Therefore quality assurance personnel examine not only the mean (XBAR chart) but also the range of values in their sample lots. Again, examine the boltsize.LAZ file with the option Statistics / Statistical Process Control / Control Charts / Range Chart. Shown below is the specification form and the results:



The dialog box titled "Range Charting" contains instructions and fields for setting up a range chart. The instructions state: "Directions: First, click on the variable name that represents the sample lot number. Next, click on the variable that represents the measurement. Click on the sigma button to change the default and click on any of the optional check boxes and enter specifications desired. Click the Compute button to obtain the results. Up to 200 groups may be analyzed. NOTE! Equal group sizes of 2 to 25 required for ranges analysis. Control limits are plus and minus 3 sigma." The "Selection Variables:" list contains "Lot No" and "Bolt Lngth", with "Bolt Lngth" selected. The "Group Variable:" field contains "Lot No". The "Measurement Variable:" field contains "Bolt Lngth". The "Option:" section has a checkbox for "Print Chart" which is unchecked. Buttons for "Compute", "Return", "Reset", and "Cancel" are on the right.

Figure 1 Specification Dialog for the SPC Range Chart

Group	Size	Mean	Range	Std.Dev.
1	5	19.88	0.90	0.37
2	5	19.90	0.70	0.29
3	5	20.16	0.60	0.27
4	5	20.08	0.70	0.29
5	5	19.88	1.20	0.49
6	5	19.90	0.90	0.39
7	5	20.02	1.10	0.47
8	5	19.98	1.00	0.43
Grand Mean = 19.97, Std.Dev. = 0.359, Standard Error of Mean = 0.06				
Mean Range = 0.89				
Lower Control Limit = 0.000, Upper Control Limit = 1.876				

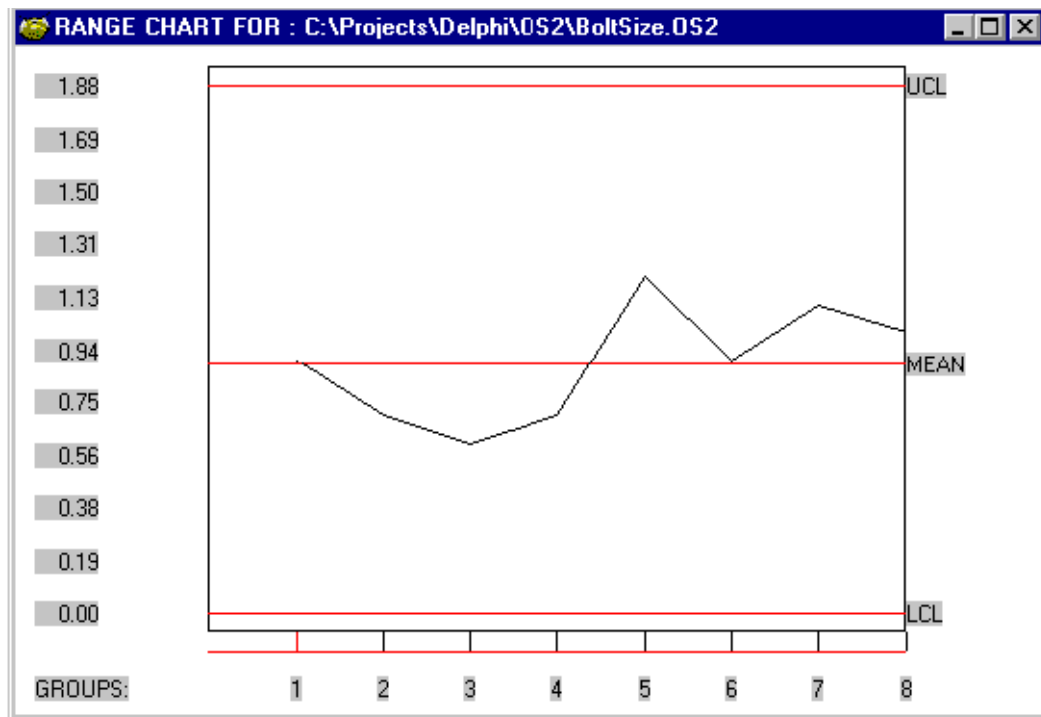


Figure 2 The SPC Range Chart