













Figure 5. a) Histogram and b) Normal probability plot for the lift-to-drag ratio response variable using BBD

#### 4. Conclusion

RSM is a useful and powerful tool to provide a prediction model representing the lift-to-drag ratio, as well as the optimal conditions of the factors influencing the performance of a multi-element hydrofoil, in order to achieve the highest possible performance. In the current work, several DOE, including a  $3^k$  full factorial design, BBD and CCD were conducted to obtain the optimal values for  $d$ ,  $h$  and  $\delta$ . It was found that by using BBD the maximal lift-to-drag ratio was 69.9626. This value was achieved under  $d$ ,  $h$  and  $\delta$  equal to 2.0%, 18.4619% and  $20^\circ$ , respectively. Additionally, it was found that the lift-to-drag ratio is strongly affected by the variations of  $\delta$ .

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