

Temperature Field Analysis of One-step Injection Molding of Compound in Barrel

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Abstract: The temperature field of one-step injection molding compound in the barrel was analyzed. By establishing physical model and mathematical model, the whole screw was divided into six sections, and the temperature change of rubber compound in barrel was simulated in turn. The screw and barrel were bound by temperature 140 °C. The heat conduction between the screw and barrel was assumed as the main factor affecting the temperature field, and the heat flux changed linearly. Through finite element analysis, the plasticizing temperature could be fully reached with the residence time of 48 s when the length to diameter ratio of the screw was 14 and the lead was 90 mm. Therefore, by optimization of the screw parameters, such as the pitch of the screw and the length to diameter ratio of the screw, the material consumption of the screw and barrel could be reduced, and the equipment design was optimized.

Key words: injection molding; temperature field; finite element analysis; screw design

2018年我国复合橡胶的进出口概况

据中国海关统计,2018年我国复合橡胶的进口量为113 824.66 t,同比降低5.03%,进口金额为38 978.10万美元,同比降低4.24%。其中,与炭黑等混合的未硫化复合橡胶的进口量为97 292.30 t,占复合橡胶总进口量的85.48%,同比增长3.18%,进口金额为31 704.23万美元,同比增长0.15%;其他未硫化的复合橡胶板、片、带的进口量为8 695.35 t,占总进口量的7.64%,同比降低23.97%,进口金额为3 862.31万美元,同比降低11.31%;其他未硫化的初级形状复合橡胶的进口量为7 472.78 t,占总进口量的6.57%,同比降低28.05%,进口金额为3 320.56万美元,同比降低11.90%;未硫化的复合橡胶溶液及分散体的进口量为364.23 t,占总进口量的0.32%,同比降低90.26%,进口金额为91万美元,同比降低90.15%。

2018年我国复合橡胶的出口量为14 625.58 t,同比降低14.42%,出口金额为4 252.39万美元,同比增长3.60%。其中,与炭黑等混合的未硫化复合橡胶的出口量为5 899.60 t,占总出口量的40.34%,同比增长50.40%,出口金额为2 275.44

万美元,同比增长74.41%;其他未硫化的复合橡胶板、片、带的出口量为7 888.10 t,占总出口量的53.93%,同比降低31.56%,出口金额为1 761.71万美元,同比降低28.51%;其他未硫化的初级形状复合橡胶的出口量为825.78 t,占总出口量的5.65%,同比降低46.75%,出口金额为214.20万美元,同比降低33.98%;未硫化的复合橡胶溶液及分散体的出口量为12.10 t,占总出口量的0.08%,同比降低86.63%,出口金额为1.04万美元,同比降低90.95%。

(崔小明)

2018年我国炭黑的进出口概况

据中国海关统计,2018年我国炭黑的进口量为95 382.217 t,同比降低6.62%;进口金额为28 372.06万美元,同比增长15.20%;进口单价为2 974.56美元·t⁻¹,同比增长23.36%。2018年我国炭黑的出口量为875 924.511 t,同比增长19.78%;出口金额为115 290.61万美元,同比增长67.58%;出口单价为1 316.22美元·t⁻¹,同比增长39.90%。

(崔小明)