The process of plasma spheroidization of metal powders consists in introduction of a powder with irregular grains into the plasma area (temperature of several thousand degrees), melting of the powder and its solidification while keeping a spherical shape when leaving the plasma area. One of the advantages of the plasma technique is that it can be used to process refractory metal powders. Due to the high melting point (Mo - 2623°C, W - 3422°C, Re - 3186°C), spheroidization of this type of materials is limited or impossible to be performed by other methods. Thanks to the use of argon-hydrogen plasma, it is possible to obtain a powder of high purity and the proper grain fraction. The developed method of producing the powder uses a constant current (DC) plasma torch.