This thesis is written to compare indices, which describe the perceived temperature of human body in thermal environment and apply them to study the thermal comfort of city inhabitants. The thesis is divided into five parts.

In the first part, many thermal indices are presented and classified into empirical, commercially used or analytical indices by their definition. The practical usage of thermal indices is mentioned in the next chapter.

In the third chapter, the most suitable thermal indices for describing the urban thermal comfort are found. Those are UTCI, PET, PT, SET* and mPET. Thermal index mPET .has been chosen to be used further in this study.

The fourth chapter includes the application of mPET on meteorological data from Prague, Berlin, Hamburg, Nürnberg, Köln and Frankfurt. The frequencies and long-term behaviour are studied as well as the effect of the street canyon for Prague's streets Dělnická, Rohanské nábřeží, Legerova and Vinohradská.

The last part discusses the results. The thermal comfort in Prague and Berlin, together with the effects of the street canyon in Prague are studied more closely. It was found that in Prague, Berlin, Hamburg, Nürnberg and Frankfurt, the frequencies of evening thermal discomfort, in terms of heat stress, are higher in the cities than in surrounding areas which is a consequence of UHI. Furthermore, the frequency of days with heat stress increases and the number of days with cold stress decreases in Prague, Berlin, Nürnberg, Köln and Frankfurt. Besides, the simulation of the street canyon model showed the importance of tree planting in Prague streets Legerova and Vinohradská and the importance of using high albedo materials for building in Dělnická and Rohanské nábřeží street in order to achieve more comfortable thermal environment.