MATERIALS AND STRUCTURES SYMPOSIUM (C2)
Specialized Technologies, including Nanotechnology (8)

Author: Mrs. Larysa Potapovych
Yuzhnoye State Design Office, Ukraine, info@dpukrconfiaa.org

Mr. Alexandr Potapov
Yuzhnoye State Design Office, Ukraine, dnsk07@mail.ru

DESIGN AND TECHNOLOGICAL METHODS IN ASSURANCE OF CLEANLINESS OF
ROCKETRY-SPACE OBJECTS FOR RELIABILITY AUGMENTATION OF THEIR PERFORMANCE

Abstract

Assurance of a high cleanliness level for rocket and space engineering articles is a prerequisite of their performance reliability and competitiveness in the world market of space services. There were reviewed the applied design and technological methods in achievement of this objective. The basis of proposed methods is the developed systems of differential requirements in relation to cleanliness at all design, manufacturing and operational steps that take into account their purpose and design singularities. Based on these requirements, there was accomplished a number of modifications in articles' design, which allowed augmentation of their cleanliness level. Selection of materials utilized in the articles' design is accomplished based on studies into their dust- and gas emission level. This paper presents the technology for assurance of the required cleanliness level during manufacture and operation of articles, which was developed and implemented in production. The efficiency and sufficiency of the proposed design and technological methods in assurance of cleanliness of launch vehicle and spacecraft payload units were validated by computational and experimental techniques. The work performed resulted in development and introduction in production of the conception allowing consistent solution of problems in assurance of cleanliness for launch vehicles and spacecraft at all phases of their design, manufacture and operation. Such an approach makes it possible to achieve the high level of articles' cleanliness at minimal process costs, and was successfully realized during launching of carrier rockets and spacecraft.