

HVAS Spray Method

A detailed description of the technology, surface preparation & application procedure

High Velocity Arc Spray HVAS uses electrical energy obtained from an arc discharge in the air - between the ends of the feed-stock wires. Compressed air is used to atomized and accelerate the material towards the substrate to produce a coating. The coating is characterized by high adhesion to the substrate, minimal porosity (0.04% for IN625) and a low oxides content.

Outside Poland **HVAS** technology is a well established and widely used method of metallic coating, producing coatings with very high properties and exceptional performance characteristics. In the USA, this method is commonly used to protect the surfaces of power boilers against low-oxygen and chemical corrosion and solid particle erosions. The essence of this technology is to cover the protected surface with a thin layer of liquid metal with high protective properties. The metal droplets solidify upon impact onto the surface of the component to be protected, such as boiler tubes, creating a protective layer. Important factors controlling the quality of the coating are the cleanliness and uniformity of the liquid metal stream, which essentially depends on the quality of the material used (wire), cleanliness of the compressed air and the set-up of the coating equipment. Deposited coating creates mechanical bond with the substrate; its strength results from the quality of the substrate surface preparation, i.e. its cleanliness and proper surface profile.

Całkowity proces **HVAS** składa się z następujących etapów: dokładne oczyszczanie powierzchni, natrysk IN625 metodą **HVAS**, QC. Oczyszczanie powierzchni wykonywane jest metodą strumieniowo ścierną przy użyciu wysokojakościowych ścierni o określonej granulacji. Skutkiem oczyszczania powierzchni ekranów jest powierzchnia o czystości Sa3 tj. czysty metal bez jakichkolwiek zanieczyszczeń i o określonej chropowatości. Powierzchnia ta przed natryskiem ciepłym jest dodatkowo odmuchiwana i odkurzana.

The surface temperature of the substrate does not increase significantly during the application of the coating; this temperature should not exceed 100-120 ° C.

In a short, **HVAS** process consists of the following steps: detailed surface cleaning, coating deposition using HVAS spraying with method, QC. Cleaning of the surface is performed with the abrasive blasting method with the use of high-quality abrasives of specific granulation. Required surface finish – Sa3 or better, i.e. white metal without any contamination and with a specific roughness. Before thermal spraying, this surface is additionally compressed air cleaned.



Surface Preparation.



HVAS in action

HVAS arc spray method uses clean compressed air to atomize molten metal into small metal droplets which are then accelerated towards the substrate.

The use of HVAS technology guarantees that the coatings will be of the highest quality, with very low porosity, which in the case of the IN625 coating material is as low as 0.04%. Coatings produced by the HVAS technology have a quality comparable to those made by the HVOF method. This method enables the application of thick, multilayer coatings.

Very wide range of available coating materials makes this process very flexible in terms of possible applications. The choice of material is made on the basis of data relating to a specific application, so that the coating made of it has the most optimal operational properties

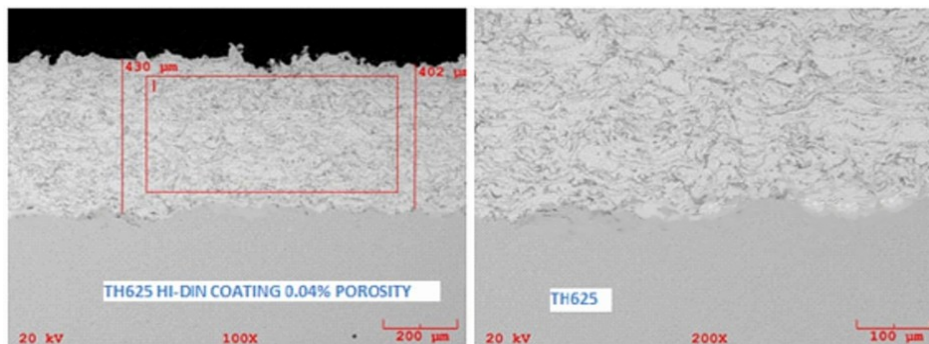
Typowy przekrój powłoki IN625 przedstawiono poniżej. W zależności od stosowanego materiału twardości wytwarzanych powłok metalicznych dochodzą nawet do 1500 HV (metal amorficzny Tuff-888)

Oznacza to, że nasze urządzenie może wytwarzać powłoki o właściwościach co najmniej porównywalnych z powłokami Cold Spray, HVOF, lub warstwami napawanymi, przy nieporównywalnie niższym koszcie operacyjnym.

Poniżej przykładowa struktura powłoki IN625 wykonanej metodą **HVAS**

Properties of the coating

HVAS is an innovative technology that produces metallic coatings with a porosity of less than 0.3% for 420SS stainless steel and 0.04% for Inconel 625. Depending on the material used, the hardness of the deposited metallic coatings can be as high as 1500 HV (amorphous metal Tuff-888). This means that HVAS can produce coatings with properties at least comparable to Cold Spray, HVOF, or hardfacing layers, at an incomparably lower operating cost. Below is an example of the IN625 coating structure made with the HVAS method



HVAS – powłoka z IN625

As a reference, coatings deposited with the use of standard twin arc spray systems have much lower qualities, with guaranteed porosities being with the range of 4-5%.