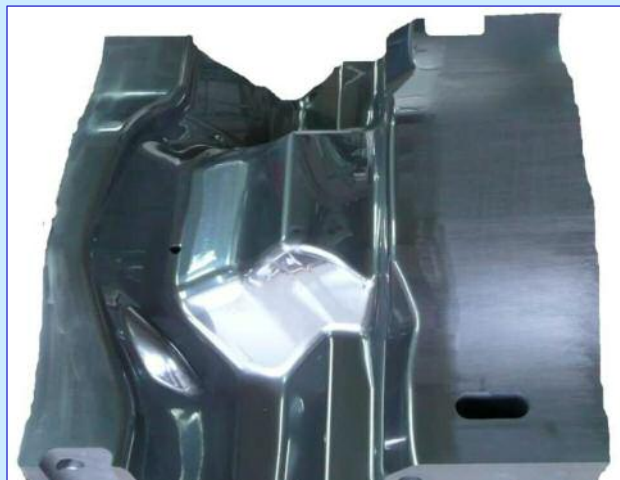


# TIGRAL -Aluminum-Chromium-Titanium-nitride

## very high resistance against oxidation and abrasion

### Properties

TIGRAL is based on AlCrTiN and is characterized by a high warm hardness, very high oxidation resistance and a high protection against abrasive wear. These unique properties are based on a nano-scaled structure which is effectively limiting the propagation of micro cracks induced by heavy shear loads under high temperature conditions.



Forming die from D2, weight about 700 kg:  
 polished and coated with DUPLEX-TIGRAL of 5 µm

### Cutting

For dry cutting TIGRAL shows good performance. For interrupted cutting operations with high contact temperatures between chip and rake face this coating is very suitable. Also for reaming of medium and high alloyed steels TIGRAL shows its applicability.

### Sheet metal operation

TIGRAL is designed to function best in the temperature ranges normally seen in warm forging applications. Here the increased warm hardness, in combination with the high resistance against oxidation, are the main features. Quite often the creation of cracks in the substrate leads to the failure of the tool. The suppression of crack propagation inside this type of coating is a significant, contributing factor to extending tool life.. Tigral is not limited to warm forming, in that in cold forming applications, TIGRAL shows very good performance: very high protection against abrasive wear and a limited tendency for cold welding with steel.

In numbers:

	<b>TIGRAL</b>
hardness	3300 ± 300 HV
max. operation temp.	900° C 1652° F
coeff. of friction against steel	0,6
coating thickness	3 - 5 µm
colour	dark grey

**TIGRAL**