Dear Customer,

Outlined below are our general "good practice" guidelines for the use of additive manufacturing HPDC tooling inserts. These guidelines have not been developed for a specific part or application, but are considered general good practice.

Please refer to these recommendations as an initial guide. However, if you do have any specific questions relating to your product or application our HPDC experts are available to assist you. Our aim is to provide you the highest level of customer support.

Contact us: email: lorenzo.pesenti@voestalpine.com

Website: www.voestalpine.com/hpm/italia/it/am

RECOMMENDATIONS FOR OPERATION & MAINTENANCE OF AM INSERTS	
1	Please consider the risk of too low die temperatures at hot work steels used in the die casting operations. Cold water can dramatically reduce the die temperature. This will influence the material properties of the die steel, especially the ductility (toughness) which is very important for the die life time (e.g resistance to heat checking, cross cracks...). This will help to reduce the risks for early failures and fall outs.
2	The introduction of conformal cooling can significantly improve heat transfer from the surface of the tool. Therefore, in many cases the classical spraying time can be reduced when compared to conventional inserts.
3	The build-up of scale in the cooling channels should be prevented to maintain optimum heat transfer. Whenever possible treated (softened) water should be used.
4	Conformal cooling channels can vary in size and dimension. Sometimes these channels will be down to e.g. 2–3mm in diameter. Therefore, sufficient filtering of the cooling medium should be done. For mechanical filter we recommend a mesh size of 100 microns.
5	Due to the difference of the cooling-channel dimension and cross section pressure drop might happen in some areas. Therefore, we recommend the use of separate or additional/individual pump units to optimize the flow rate and cooling media temperature in each line.
6	In some cases conformal cooling channels will be close to the tool surface. Therefore we suggest to control and monitor the temperature and flow rate of the cooling medium. We recommend the following guidelines for flow rates: 1 - 10 l/min for 2 - 6 mm dia channels; 10 - 30 l/min for 6 - 10 mm dia channels.
7	To prevent corrosion inside of the cooling channels we recommend the use of sufficient water additives.

Dear Customer,

Outlined below are our general "good practice" guidelines for the use of additive manufacturing HPDC tooling inserts. These guidelines have not been developed for a specific part or application, but are considered general good practice.

Please refer to these recommendations as an initial guide. However, if you do have any specific questions relating to your product or application our HPDC experts are available to assist you. Our aim is to provide you the highest level of customer support.

Contact us: email: lorenzo.pesenti@voestalpine.com

Website: www.voestalpine.com/hpm/italia/it/am

RECOMMENDATIONS FOR OPERATION & MAINTENANCE OF AM INSERTS	
8	Ensure that the cooling medium is maintained to maximize heat transfer properties. Additive dosing regimens should be maintained and the medium is flushed or changed as per the supplier recommendations.
9	Where possible ensure the cooling circuits in die are adequately deaerated (oxygen in the water increases aggressiveness and can lead to corrosion).
10	Ensure that heat exchangers are regularly maintained to maximize heat transfer efficiency (periodic cleaning to remove algae, scale and dirt).
11	We recommend using thermally isolated hoses for tempering lines from tempering unit to die.
12	Inspect fittings to ensure there are no blockages or restrictions that can limit cooling medium flow (between tempering unit and die).
13	After each production run clean channels with appropriate chemical for descaling (recommended 1-2 hours).
14	Inspect the die channels for debris, lubricant or any other foreign objects before putting in operation.
15	When storing dies flush the cooling channels with a preservative fluid and dry them to prevent corrosion when not in use.