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# Investigations on Glass-to-Metal Interactions

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## Abstract

During the forming process in hollow glass production contact occurs between the hot glass gob and metallic moulds. The longer a mould is used, the more it wears out and eventually the glass melt begins to adhere to the mould, causing various defects in the final product. To delay this sticking of the gob and to allow smooth loading of the gob into the mould, it is treated with a mineral oil-based lubricant at regular intervals. However, this procedure leads to downtime during production and raises issues concerning occupational safety and environmental protection. For the development of improved mould materials as well as coatings that can enable a lubricant-free dry loading process in the future, it is necessary to better understand the behaviour of the glass melt on metallic/ceramic surfaces. First investigations of glass pellet to metal contact in a hot-stage microscope (HSM) show a high influence of the substrate material and atmosphere on the wetting and sticking behaviour. While conventional HSM experiments are limited to isothermal and static conditions, industrial glass forming is dynamic and non-isothermal. To reflect these conditions, a lab scaled setup was constructed where a glass drop at industrial gob temperature is generated and poured onto an individually heated substrate, held at mould temperature and in a defined atmosphere. With this setup new insights can be gained into the wetting and moving behaviour of glass melt on different substrates. Newly developed mould materials and coatings containing solid lubricants are tested in regard to wetting and contact behaviour and for suitability for a dry gob loading process.

**Keywords:** glass forming, gob loading, mold, glass, metal, wetting, sticking, friction

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