Advanced components for the extrusion industry

ENGINEERING AND SUPPORT FROM UDDEHOLM MACHINING
What really drives us is the ongoing dialogue with customers, whereby together we improve the finished product and production economy. Because at the end of the day, extrusion components are simply a way of meeting technical and financial requirements from our customers’ customers.

The extrusion industry requires materials and components that can cope with extremely difficult conditions. Having worked together with extrusion plants for more than 30 years, we have seen many problems and success stories and have definitely learned a lot. High quality and creative solutions stem from the combination of the experience at Uddeholm Machining and the highly qualified researchers and application engineers of our Uddeholm sister companies.

Market-leading companies have chosen Uddeholm Machining as their business partner. We design and produce extrusion components. These are often delivered as parts of a system, complete with heating and cooling systems, as well as an on-going service commitment. For example, when the extrusion container needs reconditioning, Uddeholm Machining carries out a service at its plant in Hagfors, Sweden. We also keep a log of our customers’ tools, making it easy to amass knowledge over time and monitor the customer’s tool and any servicing carried out. This is a service we know is valuable.

Let us be your partner in the never-ending search for highest performance and lowest cost per produced unit. Together we find the causes of any issue and advise you to appropriate countermeasures. In addition to advice, we also provide drawings, engineering support and components or systems. Maybe it is time to talk?
Containers can be built in two or three parts. A two-part container consists of a mantle and a liner, while a three-part one comprises a mantle, an intermediate liner and a liner proper. The function of the container is to take up the hydrostatic and tangential stresses derived from the extrusion force. Nowhere in the container should these stresses exceed the elastic limit, i.e. the working stress range is similar to that for a dummy block with the qualification that liner and mantle are at different temperatures and will thus be characterized by different stress-strain curves.

**WHAT COULD GO WRONG?**
If the elastic limit for the steel in the mantle is exceeded, the whole container will deform plastically to an extent that it may go out of tolerance. In an extreme loading situation, the entire container might crack. Containers subjected to heavy loads are thus normally built in three parts. While this is obviously more expensive, it does give the advantage that the stress levels in each individual part are reduced appreciably at a given extrusion pressure, when compared to a two-part container.

The container is, in many ways, the heart of the extrusion process. It represents a substantial initial investment, as well as a delicate balance between the cost of maintenance and the cost of production disruption. Life-cycle economy requires in-depth knowledge of steel grades, design, and heating systems. As well as close on-going monitoring to minimize service costs without risking disruptions.

**WHY UDDEHOLM MACHINING?**
Our container production is based on a profound knowledge about the performance of steel, the conditions in metal extrusion and the experience and skill of our people.
- We provide the best steel whatever grade you choose
- We advise and assist you if changes are going to be made
- We install modern heating systems

Our commitment does not end as the new-built container is delivered. During the container’s lifetime, thousands of billets pass through it. Both container and liner are subjected to a number of factors that affect life-cycle profitability, production economy and quality of the end result. We work closely with our customers to prevent premature breakages, unjustifiable production stops and to improve production profitability. A first step is to trust us with relining. We produce and fit the liners according to our long experienced standards. And when doing so, we check the container thoroughly and document its status. This means that at every new relining, we can compare the present status with previous. That allows us to forecast the life of the container and advise on how to counteract.

Uddeholm Machining containers and liners perform well because they are fitted to each other carefully with thermal load, press forces and present status taken into consideration. Container status is well documented and evaluated and forms a solid base for preventive actions, planned changes and trouble-free production.
Stems

The stem transfers the power of the main cylinder onto the billet, via a dummy block. Stems are subjected to high pressure during extrusion but their working temperature is relatively low, as they are not in contact with the billet. The stem must not bend, deform or crack during operation.

**WHAT COULD GO WRONG?**
Stems operate under high pressure loads, why centering is key and all centering adjustments must be monitored regularly. Unbalance may result in cracks and bending of the stem.

With high-pressure stems, finally the front of the stem may deform and expand laterally. The surface will also harden due to repeated impact with the dummy block, which eventually could lead to micro cracking.

Such breakages must be prevented, or they may harm the press equipment, cause down-time and, potentially, serious personal injuries.

**WHY UDDEHOLM MACHINING?**
Uddeholm Machining produce stems in hardness range 46 – 50 HRC. Independent of what material is to be extruded, we commonly use Uddeholm Orvar 2 Microdized, Uddeholm Dievar or Uddeholm Formvar tool steel.

Due to the high pressure and a dangerous environment, it is of great importance to regularly inspect the stem in respect of parallelism between the planes, straightness and surface condition. Uddeholm Machining offers a maintenance program for stems, which includes regular check-ups.
 Dummy Blocks

The dummy block is the extension of the stem, transmitting force to the billet – over and over again. It needs to expand immediately under load, and on return separate from the billet and contract instantly.

WHAT COULD GO WRONG?
It is no wonder that dummy blocks wear. The problem is that they often wear too fast, which drives costs for loss of production time and manpower. As well as cost for the dummy blocks themselves. Unassuming as it may appear, the dummy block has a profound impact on quality and productivity. Malfunction causes bad quality in the finished products as well as disruptions, whereas a good dummy block works perfectly throughout the production run and even compensates for e.g. minor misalignments of the press equipment.

WHY UDDEHOLM MACHINING?
We work closely with our customers to develop and manufacture the perfect dummy block for each application and specific needs. Learnings are continuously fed into the process and whether we produce to customers’ design or provide our own, our aim is always to contribute to a hassle-free and efficient production process.

Over the years, we have faced and analyzed most of the problems normally associated with faulty dummy blocks. So we developed the Hagbard active pushing block, which combines the superb performance of Uddeholm hot work steel with an ingenious design. The design is based on long experience from cooperation with extrusion plants, technical know-how, and elaborate calculations. The design not only enables rapid change – it also ensures long trouble-free operation. Hagbard comprises few parts which makes it easy to handle and service.
Shear Blades

Oxides and other impurities of aluminium typically contaminate the radial surface of the billet. Eventually, impurities and oxides end up at the butt end of the billet. If the butt end is not removed from the billet prior to loading another billet, impurities and oxides will find their way into the extrusion.

WHAT COULD GO WRONG?
Shear blades are subjected to wear at elevated temperatures. Often inadequate steel or design results in excessive damage to the knife. Which in turn means increased costs for blades, unnecessary labour costs, as well as lower aluminium yield.

TYPICAL PROBLEMS
As the butt is being sheared at the face of the die, aluminium is pulled from the ports of both hollow and feeder plate dies which leave voids to entrap air when the next billet is pressed against the die and air blisters will easily appear on a large portion of extrusions.

Extensive aluminium build-up on the face of die, die ring, and container face is caused by the tendency of the butt shear blade to be forced away from the die during the shearing operation. Additionally, shear blades tend to tear the butt off rather than clearly shearing it. Thus, the aluminium left on the die face is rough and uneven. When the container, holding another billet comes into contact with the aluminium left on the die face, air voids are created between the billets. These air voids cause blisters in the extruded products. The uneven sealing surface, caused by the partly displaced aluminium, can cause the container to tilt in various planes as it attempts to seal against the die face. This creates misalignment and puts stress into the press frame and all included press tooling.

WHY UDDEHOLM MACHINING?
We developed Attila in order to help our customers prevent these costly problems, and also to reduce work and downtime associated with the changing of knives.

Attila is made from Uddeholm hotwork steel, with a special design from Uddeholm Machining means that it is easy to change. Also, only the working part is changed which saves tune as well as material.

Uddeholm machining also produce cutting components to customers’ specifications, contributing with in-depth knowledge of steel grades, design and workability. And, of course, a skilled workforce and state-of-the art production lines to ensure the right quality and hassle-free production.
Uddeholm Machining

A COMPANY IN THE UDDEHOLM GROUP

UDDEHOLM is the world’s leading supplier of tooling materials. This is a position we have reached by improving our customers’ everyday business. Long tradition combined with research and product development equips Uddeholm to solve any tooling problem that may arise. It is a challenging process, but the goal is clear – to be your number one partner and tool steel provider.

Our presence on every continent guarantees you the same high quality wherever you are. ASSAB is our wholly-owned subsidiary and exclusive sales channel, representing Uddeholm in various parts of the world. Together we secure our position as the world’s leading supplier of tooling materials. We act worldwide, so there is always an Uddeholm or ASSAB representative close at hand to give local advice and support. For us it is all a matter of trust – in long-term partnerships as well as in the development of new products. Trust is something you earn, every day.