

Duroblade®-Energy wear-resistant blades deliver top results for LWC manufacturers

In the highly competitive Lightweight Coated segment, BTG's new-generation Duroblade-Energy ceramic-tipped blades are delivering better runnability, reduced waste and lower production overheads – for improved productivity, and profitability.

The Lightweight Coated (LWC) market has long been regarded as a difficult segment for long-life blades. Technical challenges and intense pressure on costs due to overcapacity in Europe and North America has traditionally seen most manufacturers stick to cheap, conventional steel blades, despite the significant overheads imposed by frequent blade changes.

New advances in blade technology, however, combined with improvements in coating systems and paper machines are suddenly making long-life blades the preferred solution for manufacturers looking to keep production costs pegged. Delivering better results with fewer machine stops and less broke, BTG's new Duroblade-Energy is helping papermakers maximize output volumes while eliminating the production problems that can result from less robust blade technologies.

Duroblade-Energy vs Steel blades

BTG's Duroblade-Energy long-life blade delivers great performance with all LWC grades. Based on a new ceramic-type material, the blade is the result of extensive research into optimum blade technologies for stiff applications. Demonstrable benefits include blade lifetimes three times longer – and sometimes more – than conventional steel blades, reduced edge-wear, better machine efficiency and runnability, excellent CD profiles and run-in time, dry friction resistance, and substantially improved coatweight control.

ULWC / LWC / MWC papers

Basis weight: 39 to 80gsm

Coat weight: 5 to 12gsm

Fiber furnish:

50-70% mechanical pulp, GW or TMP

30-50% chemical pulp



Figure 1 - Typical LWC coater

The LWC segment comprises three subfamilies – ULWC, LWC and MWC with Offset and Rotogravure printing ends. While offset printers care about smoothness and stiffness, Rotogravure applications are even more demanding when it comes to smoothness and profiles.

Ordinary steel blades deliver highly varied performance ranging from 5-24 hours, depending on the abrasiveness of the color formulation. Different steel blade thicknesses also result in different contact surfaces; typical thicknesses/calipers are 381, 457 and 508 microns (0.015, 0.018 and 0.020 inch). During blade life, width can be reduced by as much as 2-3mm, automatically increasing the wear angle. Thus the contact surface slightly reduces during the blade life, theoretically increasing the specific pressure. In the case of tube pressure, the width reduction counteracts this increase and leads to a continuous increase of tube pressure during blade life.

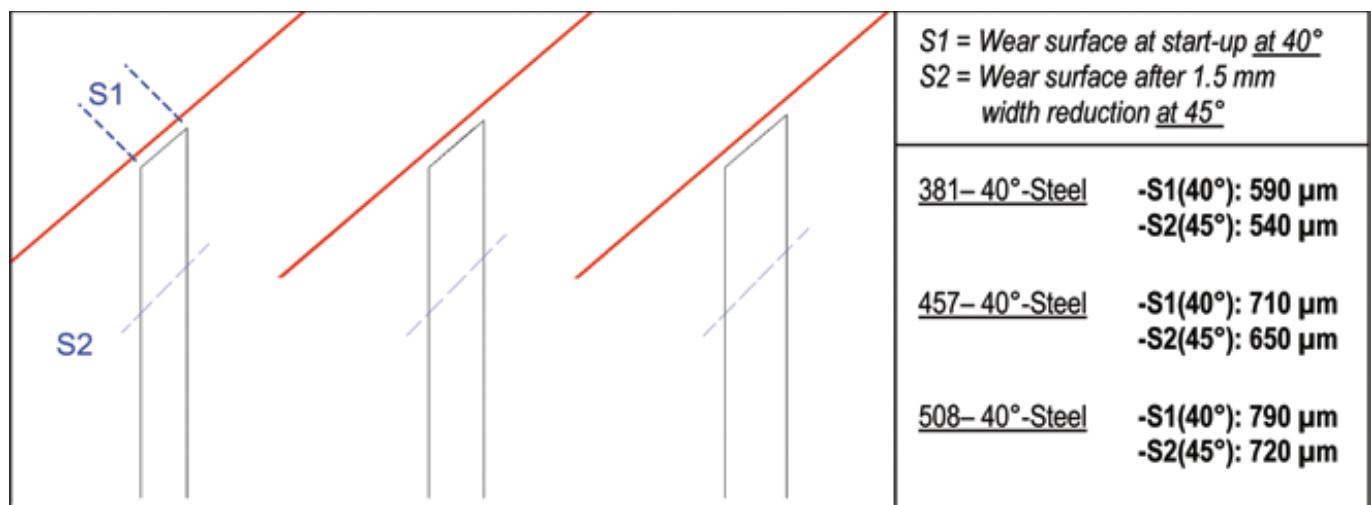


Figure 2 - Evolution of contact surface during blade life with different steel blade thicknesses

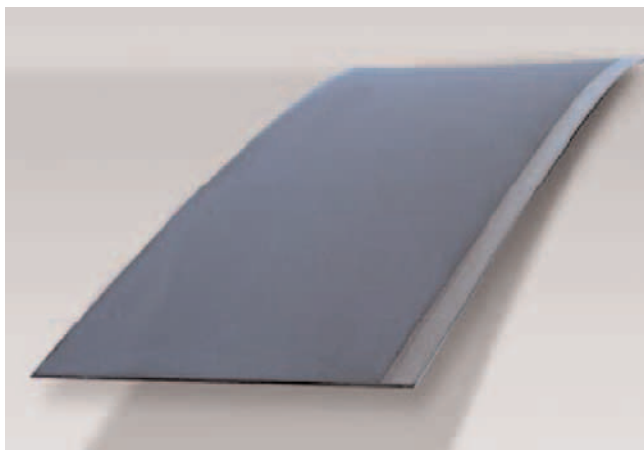


Figure 3 - Duroblade-Energy

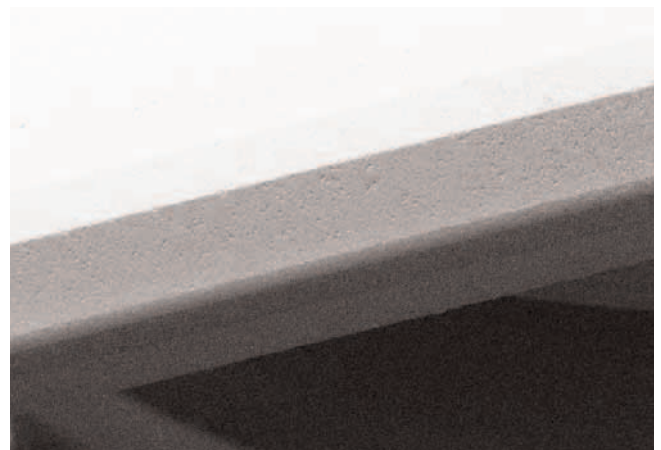


Figure 4 - Close-up of the working edge of DB-Energy

In an increasingly competitive world market, Duroblade-Energy represents the ideal solution to the problems and overheads associated with the use of traditional steel blades. Available for all popular specifications (thickness, angle, length and width) BTG's new high-performance blade offers:

Increased blade lifetime: Producing 50gsm LWC paper at 1,600m/min is challenging in terms of runnability. In a cost-conscious segment like LWC, the use of Duroblade long-life blades can only be justified if the blade can be kept in the coater and re-used after a web break. While the average steel blade lifetime is around 10 hours, Duroblade-Energy can deliver 30 hours' blade lifetime or more, thanks to the blade's ultrahigh wear resistance.

Reduced edge-wear/improved machine efficiency:

Edges stay cleaner than with ordinary steel blades. In the case of online coaters, this impacts directly on volumes produced by reducing the number of machine stops needed for blade changes. In addition, restarting with the same blade after a break helps achieve faster run-in, since both the automatic profilers and blade are already adapted to the base paper.

Excellent CD profiles and run-in time:

Duroblade-Energy provides an excellent balance between wear-resistance and adaptability. The unique blade design (material, geometry, contact surface, steel thickness) combined with fine-tuned automatic profiler systems delivers excellent coatweight distribution in the cross direction. In case of tube pressure, the use of thick blades is recommended in order to reduce the blade bending effect with tube pressure variation: thick blades help control the coatweight at a constant tip angle.

Dry friction resistance (ceramic = insulating properties): The thermal resistance of the ceramic-tipped Duroblade-Energy allows for running on the fastest online coater without the limitations caused by dry friction during start-up, break and machine stops. Should a jet applicator plug occur during the run, ceramic blades also give operators more time to react to avert the risk of permanent damage.

Coatweight control: The Duroblade design allows for the cutting down of coatweight much more easily than steel blades. For the same coatweight target, the pressure on the blade is much lower (20-40%), with several benefits such as:

- Compensation of tube pressure loss by a solids content increase (2-3%), which is often well accepted. This saves on drying costs and improves fiber coverage.
- Lower pressure on the web reduces the risk of breaks at the coater.

Quality improvement in Rotogravure: Because the Duroblade design helps level the coating layer more smoothly than steel, Duroblade-Energy delivers substantial coated paper surface improvements. Pigment distribution is improved with a more gentle specific pressure distribution under the blade tip. What's more, higher solids content helps keep pigments on top of the fibers, for improved fiber coverage.

A typical comparison between steel and Duroblade-Energy performance in LWC Rotogravure applications delivers:

- PPS: improved/reduced by 0-10%
- Gloss: +5% to +10%
- Heliotest: +10% to +20% improvement. Duroblade-Energy substantially boosts Heliotest values!

Problems with steel blades

Steel blade changes are prompted by:

- Breaks: cheap steel blades are often changed at each web break.
- Edge wear: light paper grades are sensitive to all edge weaknesses, so edge cleanliness is crucial.
- CD coatweight profiles: local variations of paper abrasiveness worsen the CD coatweight. Over time, automatic profilers reach their limit. Blades are changed for too high 2-sigma and the CD coatweight profile.
- Coatweight control: tube pressure increases when the width of the blade is reduced. In the case of 508-micron blades, the contact surface is long, and maximum tube pressure is quickly reached.
- Coated surface quality: particularly for Rotogravure grades with limits in PPS, Gloss and Heliotest.

Machine runnability and cost reductions: Because the coaters open less often, there's a reduced risk of web breaks at blade change. Since the pressure on the blade is reduced and the edges are cleaner, coater machines are also slightly less sensitive to small base paper defects, resulting in increased machine efficiency. Other benefits include:

- **Cost savings on drying:** When solids content is 2-3% higher, gas and steam consumption is reduced accordingly.
- **Raw material savings:** Increased quality allows for the use of cheaper raw materials in the coating color mix while maintaining coated paper quality.
- **Duroblade-Energy** is also the environment-friendly choice, because it delivers improved machine efficiency, dramatically reduces waste paper production, and massively cuts steel consumption.

To learn more about how Duroblade-Energy can raise your productivity, please contact your local BTG representative, or email us at antoine.morilhat@btg.com.