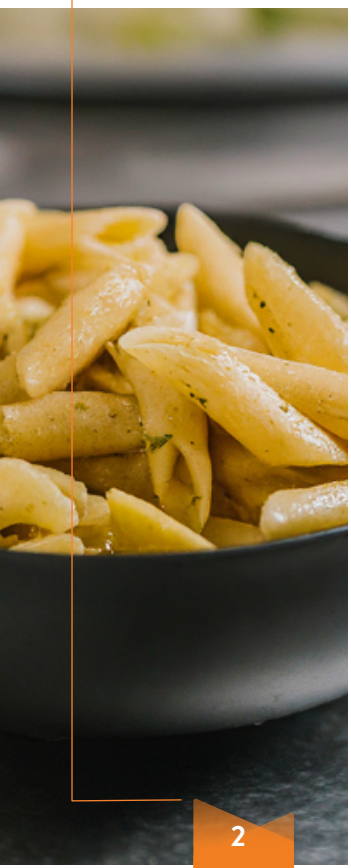
Blentech CORPORATION

How to Choose the Right Scraper Technology

The right scraper is the secret to
heating batches consistently, without burning.

Want to reduce surface burn-on and promote consistent heating to improve output and quality? The secret lies in choosing the right scraper. With so many designs available, it's easy to make the wrong choice—and mistakes can be costly. Learn what to look for in scraping technology, so that you can choose the most efficient equipment right from the start.




How Burn-On Happens

Imagine a giant batch of chili simmering away. The delicious aroma fills the room, but after emptying the cooker, you learn that the bottom has scorched. This can ruin your batch, not to mention increasing your cooking and cleaning times. This scenario is a food processor's familiar foe.

For viscous products with particulates, such as soups, sauces, and ground meats, as well as high-protein and high-sugar foods prone to scorching, the enemy is uneven heat transfer and its unwelcome companion: burn-on. These foods can create boundary-layer conditions at the heating surfaces that slow heating rates and act as insulators.

This is why you'll want to pay special attention to your scraper and its underlying technology.

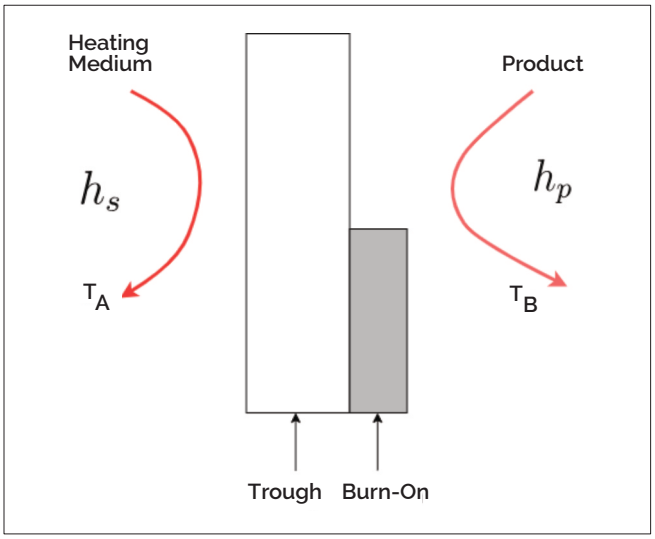


Figure 1. Heat transfer across a steam jacketed and agitated vessel.

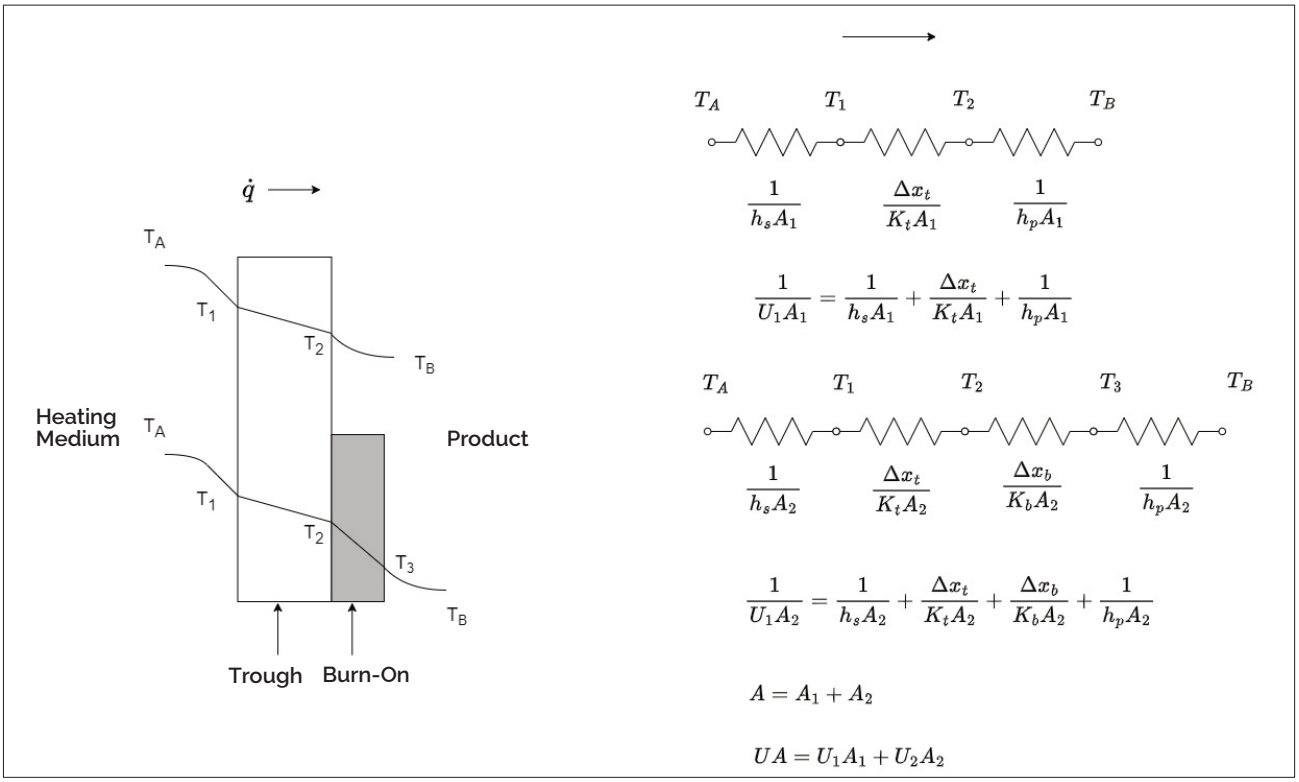


Figure 2. Heat resistance network without burn-ons.

Competitor Technology

Kettle Scrapers

Steam-jacketed kettles and jacketed mixers are used throughout the food industry. To prevent burn-on problems, engineers installed simple, low-cost scrapers. As the agitator rotates, it applies pressure created by the product pushing against the side walls. While kettle scrapers work well for low-viscosity and low-protein applications, they aren't ideal for products and foods prone to burn on.

Unfortunately, these are often the applications that benefit least from scrapers. Furthermore, scrapers are prone to breaking and chipping, and they will not function if the agitator is run in both directions.

Spring Designs

When additional scraping is required, springs are used to increase the force applied by the scraper against the heated surface. This is like adding additional pressing force when using a spatula. The types of springs used in commercial and industrial machines include coil/helical, belt, magnetic and leaf springs. When sanitary design is required, leaf springs are recommended because they minimize sanitation issues related to the coil mechanism.

Removable Springs

Some manufacturers have created removable spring scrapers based on the theory that daily cleaning is recommended. While this may be required when leaf springs are not employed, the removable springs add an additional 15-30 minutes of cleaning per day. They also have a risk of worker injury, and parts that can disassemble in the process. These factors create huge financial downsides for processors who require high OEE.

Comparison Between Different Scraper Designs

APPLICATIONS	NO SCRAPERS	FREE FLOATING KETTLE SCRAPERS	COIL SPRING SCRAPERS	BLENTECH SCRAPERS
WATER	X	X	X	X
THIN SOUPS		X	X	X
VISCOUS SAUCES			X	X
SOUPS WITH PARTICULATES				X
MASHED POTATOES/ REFRIED BEANS				X
GROUND MEAT				X

Figure 3. Comparison between different scraper designs with various applications.

Blentech's Proprietary Leaf Spring Scraper

The Industry Standard Since 1990

Blentech's scraper technology revolutionizes the way viscous products are heated. Our proprietary leaf spring scraper designs have been the established industry standard for viscous foods such as taco meats and fillings for almost 40 years.

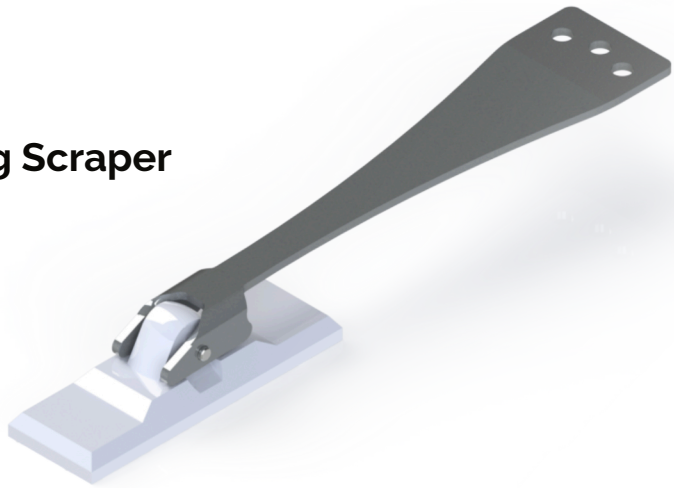


Figure 4. Standard Blentech scraperr and spring.

What's Special about Blentech Scrapers?

Blentech Scraper Longevity

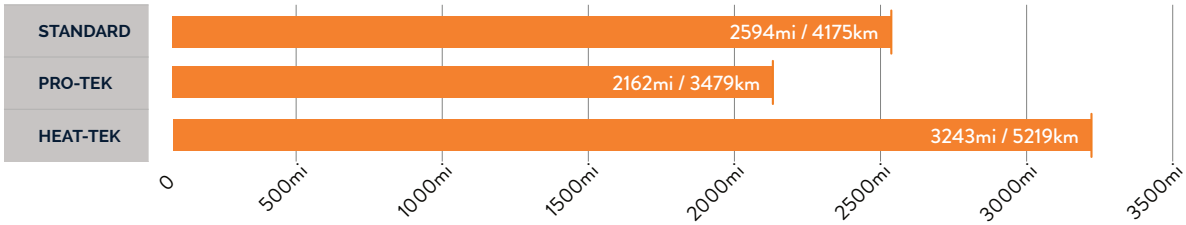


Figure 5. Calculations of linear mileage is based on BT-42096 (600 gallon capacity) with a 17.2 rpm base speed at 60Hz and a trough ID of 42 ¼ inches.

Semi-Permanent Mounting Provides More Cook Time

Blentech's patented USDA-approved scrapers are semi-permanently mounted on the cookers so that they DON'T need to be removed for cleaning. This allows for additional time cooking. Other companies make scrapers removable, which ultimately increases your risk, costs, and downtime, because they can fall out in production.

Multiple Polymer Types for Different Applications

Blentech scrapers are made in different polymer types for various applications (see Figure 4). Our springs are precision engineered for reliability, having been designed for 300% of the life of the polymer. We offer X-ray and metal-detectable options, which improve food safety.

It's important not to underestimate the value of advanced controls in optimizing scraper and cooker life.
In Figure 5, we list the linear mileage in kilometers, showing the life of scrapers and show how controlled recipe conditions reduce spare parts requirements.

Are You Just "Scraping By"?

Blentech's scraper technology revolutionizes the way viscous products are heated. At the core of Blentech's scraper technology is our proprietary design for leaf-spring scrapers that continuously:

Enhance Heat Transfer

By constantly scraping the heating surface, fresh product is continually exposed to the heat source, promoting uniform and efficient heat transfer.

Improve Mixing and Agitation

The scraping action gently mixes the product, eliminating hot spots and ensuring consistent cooking throughout.

Reduce Burn-on Risk

Minimizing product contact time with the hot surface significantly reduces the risk of burn-on, allowing for the use of higher temperatures and faster processing times.

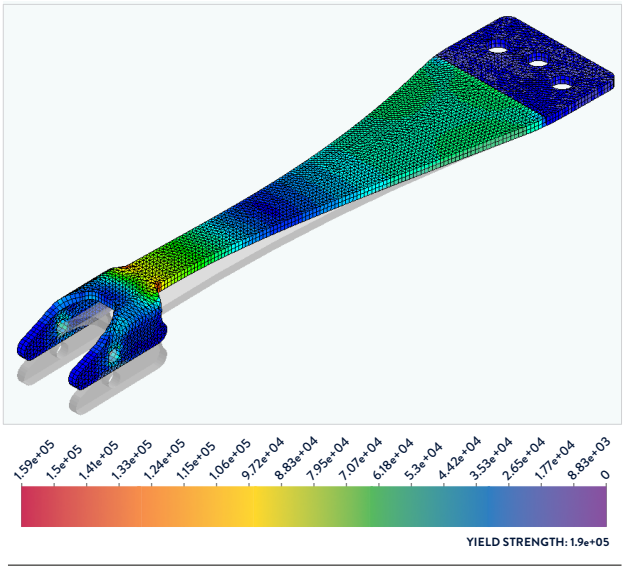


Figure 6. Scraper arm stress contour with .625 deflection color.

Various Material Configurations

Blentech scrapers are available in a wide range of compositions and colors:

Standard Scraper

General purpose, well-suited in most applications.

Pro-Tek Scraper

Least abrasive on metal surfaces. Extensively used in protein based cooking applications such as ground meats. This material reduces cleaning time for high protein applications.

Heat-Tek Scraper

Used for high temperature applications. More effective on tougher burn-on.

MATERIAL	STANDARD				PRO-TEK				HEAT-TEK			
COLOR	NATURAL	GREY	BLACK	BLUE	NATURAL	GREY	BLACK	BLUE	NATURAL	GREY	BLACK	BLUE
SHAPE-FLAT BOTTOM	x	x	x	x	x	x	x	x	x	x	x	x
METAL DETECTABLE		x		x		x		x		x		x
X-RAY DETECTABLE			x	x			x	x			x	x

Figure 7. Configurations show a wide range of colors, compositions, and capabilities.

KEY: *x = YES*

Coming Soon!

We will soon offer scrapers to retrofit on non-Blentech equipment. Please contact us today for details if you'd like to upgrade your existing equipment.

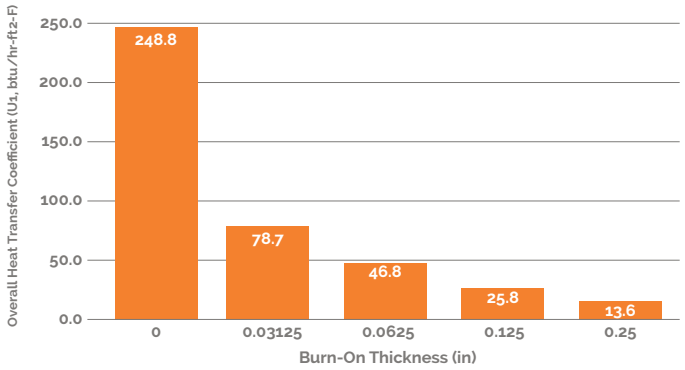
How Burn-On Impacts Heat Transfer and Cooking Time

The following tables show how burn-on thickness and coverage reduce heat transfer and increase heating time. Utilizing improper scraping can cause increased burn-on, causing longer cooking and cleaning times, and can ruin batches.

Impact of Burn-On Thickness on Heat Transfer Coefficient

JACKET SIDE HEAT TRANSFER COEFFICIENT, HS (BTU/HR-FT2-°F)	2000
THERMAL CONDUCTIVITY OF TROUGH, KT (BTU/HR-FT-°F)	112
TROUGH THICKNESS, XT (IN)	0.25
THERMAL CONDUCTIVITY OF BURN-ON, KB (BTU/HR-FT-°F)	0.3
BURN-ON COVERAGE, ALPHA	100%
PRODUCT SIDE HEAT TRANSFER COEFFICIENT, HP (BTU/HR-FT2-°F)	300

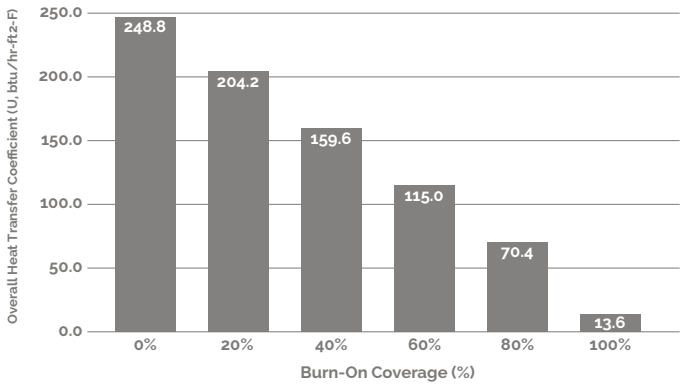
BURN-ON THICKNESS,XB (IN)	OVERALL HEAT TRANSFER COEFFICIENT, U (BTU/HR-FT2-°F)
0	248.8
0.03125	78.7
0.0625	46.8
0.125	25.8
0.25	13.6



Impact of Burn-On Coverage on Heat Transfer Coefficient

JACKET SIDE HEAT TRANSFER COEFFICIENT, HS (BTU/HR-FT2-°F)	2000
THERMAL CONDUCTIVITY OF TROUGH, KT (BTU/HR-FT-°F)	112
TROUGH THICKNESS, XT (IN)	0.25
THERMAL CONDUCTIVITY OF BURN-ON, KB (BTU/HR-FT-°F)	0.3
BURN-ON THICKNESS,XB (IN)	0.125
PRODUCT SIDE HEAT TRANSFER COEFFICIENT, HP (BTU/HR-FT2-°F)	300

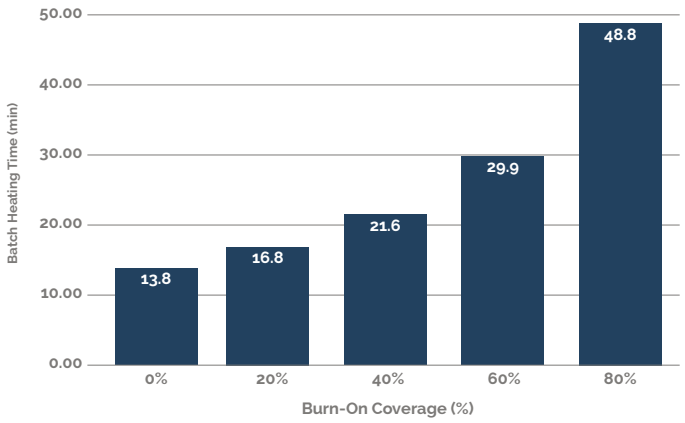
BURN-ON THICKNESS,XB (IN)	OVERALL HEAT TRANSFER COEFFICIENT, U (BTU/HR-FT2-°F)
0%	248.8
20%	204.2
40%	159.6
60%	115.0
80%	70.4
100%	13.6



Impact of Burn-On Coverage on Heating Time

BATCH SIZE (LB)	5000
STEAM PRESSURE, P (PSIG)	90
STEAM TEMPERATURE, TS (F)	331
JACKET SURFACE AREA, A (FT2)	57
PRODUCT SPECIFIC HEAT,CP (BTU/LB-F)	1
INITIAL TEMPERATURE, TI (F)	60
FINAL TEMPERATURE, TF (F)	190

BURN-ON COVERAGE	OVERALL HEAT TRANSFER COEFFICIENT, U (BTU/HR-FT2-°F)	HEATING TIME, T (MIN)
0%	248.8	13.8
20%	204.2	16.8
40%	159.6	21.6
60%	115.0	29.9
80%	70.4	48.8
100%	13.6	252.6



Blentech's proprietary scraper technology resolves the most common challenges that food processors who handle viscous products face today. You can always trust Blentech to deliver food processing equipment and technologies that help you optimize production, save costs, and minimize waste.

Get Cooking Today!

We'd love to help.
Reach out to us at 1-707-523-5949 or
email sales@blentech.com.

Blentech CORPORATION

BLENDING TECHNOLOGY WITH SIMPLICITY

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