

# The Westland Corporation

## Westland Corporation

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**MADE IN THE USA**  
**High**  
**Performance**  
**Screws**  
**and**  
**Cylinders**



# PROCESSOR

## New Glasses Adjustment

Dave Larson  
President



Dave Larson

Not needing any type of corrective lenses for several years, I suddenly found myself jostling papers to read the fine print ... and moving back from my computer screen to rectify the blur. So my first adjustment was admitting I was of the age I needed reading glasses.

Adjusting to my new progressive lenses was painful. After several hours I took them off due to a headache and total frustration. It was then I decided to take advantage of their 100% satisfaction guarantee and return the glasses.

The technician said he would honor that guarantee, but asked if the glasses had been properly adjusted when I picked them up. Well, being in a hurry that day, I really had not given them the time to do so.

The tech spent several minutes fine tuning how they fit my face, bending and tweaking them. He then asked me to please try them again for another couple of days.

It was amazing the difference that adjustment made. I now wear them all the time and find they truly enhance my ability to see and work! The same pair of glasses ... only with an adjustment!

I decided to take advantage of their 100% satisfaction guarantee ...

The same thing is true for a screw and barrel. Having the right components is definitely important for your process. However, many times an adjustment in your screw design and/or process can make a tremendous difference in your bottom line.

Westland is more than just another barrel and screw supplier. When given the opportunity, we work with you to analyze your process in order to offer suggestions for adjusting a screw design or fine tuning a process, all in an effort to help you get the most out of your production.

In this issue, we discuss how adjustments made in calculating residence time can bring added benefits and profits to your process.

Another adjustment Westland is making is how we approach our participation at NPE 2009. We believe it is important to be a part of this industry standard.

However, our participation has been scaled back including fewer components on display.

What hasn't changed is the fact that we will be ready to discuss with you the latest in screw and barrel technology plus help you address any processing issues you may be facing. Please plan to stop by our booth #17040.

Until then, I encourage you to contact us with any issues or quote needs you may have on repair or replacement parts. Westland has built a strong reputation in the industry for quality screws and barrels backed by experienced customer support. Call 800-247-1144 and ask us how you might benefit from an adjustment!

### DO YOU KNOW?

Prior to the late nineteenth century, time keeping was purely local with each town setting their clocks to noon when the sun reached its zenith each day. In the early years of the railroads, the schedules were very confusing because each stop was based on a different local time. The standardization of time was essential to efficient operation of railroads. In 1878, Canadian Sir Sanford Fleming proposed the system of worldwide time zones that we use today.

Read the full article at: <http://geography.about.com/od/physicalgeography/a/timezones.htm>

**Do you know who first proposed Daylight Saving Time?**

Answer Inside



Pictured from the left are Dave Larson, Robert Johnson, Jeremy Brown, Charles Girrens and Dan Johnson of Westland Corporation.

## ROBERT JOHNSON RECEIVES 10 YEAR AWARD

Robert Johnson was honored for 10 years of excellence in service to Westland Corporation and our customers. Robert currently works in our cylinder department. He was awarded an engraved watch in recognition of this accomplishment. Robert's dedication is yet another reason we can confidently say "Our People Make The Difference".

Several Westland employees celebrated service milestones at the same time - Dave Larson, 17 years; Robert Johnson, 10 years; Jeremy Brown, 25 years; and Charles Girrens, 28 years.

Westland has 13 employees with over 20 years of service at Westland and 10 employees with over 10 years. That experience pays off in better quality products for our customers. When you work with Westland you not only get a great product ... you get a great company!



Terry Williams, left, and Randy Wise, right, of Westland Corporation.

## NPE 2009 PLANS

Randy Wise and Terry Williams, along with Dave Larson, will be in the Westland NPE Booth #17040 located in the South Building. Please plan now to stop by and visit with them. Read more about Westland's participation at NPE on page four of this issue.

# UNDERSTANDING RESIDENCE TIME

## Residence Time Affects Part Quality

In today's market, processing engineered grade resins is widespread. It is becoming even more commonplace to run these very complicated resins with modifiers or filler packages incorporated into the process.

This reality makes it critical that injection units on machines are sized for the required residence times on each of these resins.

Residence time is the time that the resin is in the barrel before being injected. Processing outside the recommended residence time can lead to problems in your process affecting part quality and machine performance. Residence times that are too long or too short can result in sacrificing properties in the resin. This can produce inconsistency in melt quality and shot weight plus contamination, splay, burning and weakness in parts produced.

This is why it is so important to understand residence time.

## Residence Time and Shot Size Are Two Totally Different Issues

To achieve the most accurate results, shot size should not be used to calculate residence time.

Shot size is the amount of resin that can be injected into the mold.

Residence time is the time that resin is in the barrel before being injected.

Reducing the shot size on an injection molding machine does

not necessarily mean a reduction in the residence time. Limiting or increasing the stroke of a machine will change the shot size, but it does not dictate a change in the residence time.

The illustrations in Figure A on the following page demonstrate the same size screw with two different shot sizes due to a difference in machine stroke. The residence time, however, on both screws is the same.

Therefore, if a reduction in residence time is the goal, changing the stroke is not the answer.

## Calculating Residence Time

True residence time is based on what the screw inventories in its channels and the material in front of

the screw that is prepared to be injected. However, the difference between the material weight at a solid state versus a molten state must be incorporated.

For example, nylon is approximately 1.14 gram/cc in weight at a solid state and approximately 1.05 gram/cc in a molten state.

To accurately calculate the residence time, Westland uses the solid weight of the resin in the feed section, the molten weight of the resin in the meter section and computes the transition of the materials from a solid to a molten through the transition section of the screw. The volumetric area of each section of the screw (feed, transition and meter section) along with the L/D ratio (flighted length) is broken down in order to understand how much inventory is retained during the process.

Following is an example of the difference in residence time on a 57mm screw. One has an 18:1

Limiting or increasing the stroke of a machine will change the shot size, but it does not dictate a change in the residence time.

L/D; the other has a 24:1 L/D. The additional specifics of the process are:

- Stroke on the machine = based on material being processed (ie: nylon for this example)
- Solid Density = 1.14 gram / cc
- Molten Density = 1.05 gram / cc
- Overall Cycle = 35 seconds
- Shot Size of Part = 10 oz shot
- Screw Diameter = 57mm
- Screw Design = General Purpose
- Oz Capacity of Machine = 20 oz

Figure B below illustrates the same size diameter screw with two different L/D ratios. The shot size is the same for both screws.

Calculating the residence times for the different L/D ratios results in two different outcomes. The 18:1 L/D ratio equals a 1.72 minute residence time and the 24:1 L/D ratio has a 2.17 minute residence time.

There are several ways to calculate residence time for sizing injection units. One common calculation is based on the shot size of the machine and the shot weight being injected over a certain overall cycle.

The following calculation is commonly used to estimate the residence time.

**Residence Time (Minutes) or RT**  
(Sg = Material Density @ Room Temp)

$$\text{Rated Shot Capacity} / 1.05 \times \text{Sg} = \text{Inventory}$$

$$\text{RT} = \text{Inventory} / \text{Shot Size} \times \text{Cycle Time} / 60$$

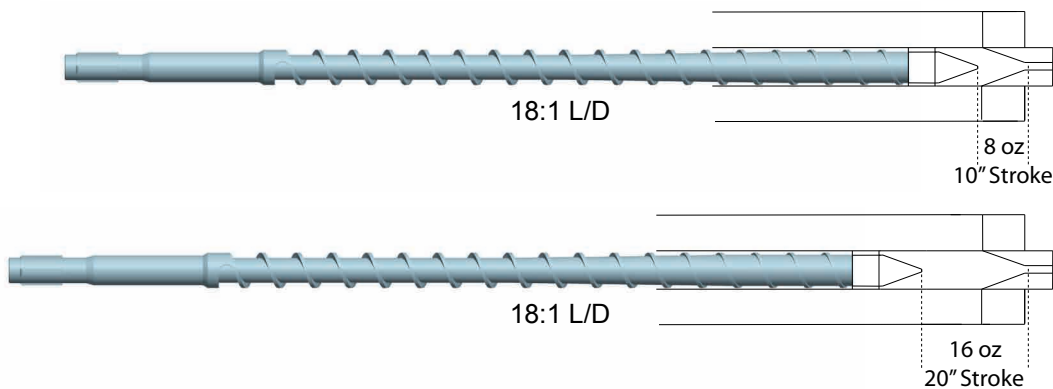
Using the percentage of stroke of the machine and overall cycle time method of calculation does not include the two different weights of the material (solid versus molten) and the L/D ratio. Assumptions then are made that the total shot capacity of the machine is equal to the total inventory of the screw.

*(Continued on back page)*



**Figure A:**

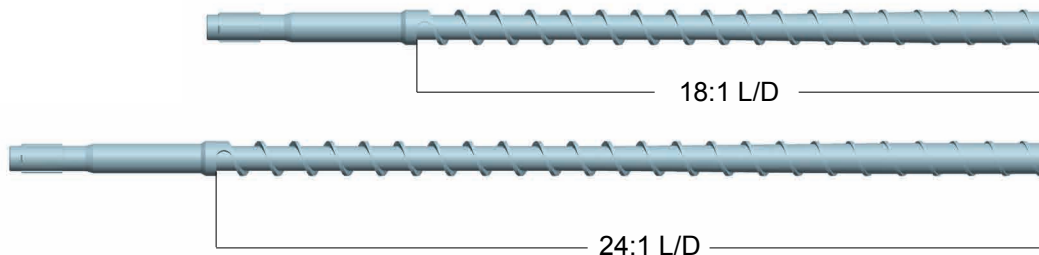
The following two drawings illustrate the same size diameter screw with two different shot sizes due to a difference in machine stroke. The residence time, however, on both screws is the same.



Answer to DO YOU KNOW? Benjamin Franklin, while a minister to France, first suggested the idea of Daylight Saving Time in an essay titled "An Economical Project for Diminishing the Cost of Light." The essay was first published in the Journal de Paris in April 1784. Read all about it at: <http://www.energy.ca.gov/daylightsaving.html>

**Figure B:**

The following two drawings illustrate the same size diameter screw with two different L/D ratios having the same shot size on the machine. Calculating the residence times for the different L/D ratios will result in two different outcomes.



(Continued from page 3)

Calculating the residence time on the data listed previously, using the percentage of machine shot capacity, weight of shot being injected and overall cycle, results in a residence time of 1.27 minutes.

Depending on how it is calculated and/or the difference in L/D ratio, there could be as high as a 20% to 40% difference in residence time.

This variance would create different processing conditions.

Westland strives to bring more to our customers besides components. We are more than just another screw and barrel supplier. Our Westland Sales & Process Engineers welcome the opportunity to evaluate your residence times to see what opportunity there is to improve part quality and cycle time.

Contact us at 800-247-1144 to begin the process of better production, parts and profits.

## VISIT WESTLAND AT NPE 2009



produced by **spi**

**Booth #  
17040  
South Hall  
McCormick  
Place  
Chicago, IL**

**June 22-26, 2009**

Westland will be displaying components and offering virtual information on the latest in screw and barrel technology ... including:

- LSR Conversion Packages
- Thermoset Conversion Packages
- Reiloy Bimetallic Barrels
- Grooved Feed Barrels
- Downsize & Upsize Conversions



# SEE YOU THERE

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