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Tanker Operations

Determining Critical
Dump Time

Determining Critical Dump Time

- It is important for each department to know the dumping capabilities of its tanker(s). We know that when dumping a tanker using the gravity method, that it is not efficient for us to wait until every last drop of water is out of the tank.
- In reality, each tanker will dump at a different rate - but all tankers will dump faster during the first minute of dumping as compared to the second minute of dumping as compared to the third and so forth.

Determining Critical Dump Time

- The important fact to learn about your tanker is what we sometimes call the “critical dump time” – or the length of time that we allow our tanker to dump before we send it on its way to a refilling site.
- For example, a 3,500-gallon tanker might dump 1800 gallons during its first minute of dumping, another 1100 gallons during the second minute and then take **two minutes** to get the remaining 600 gallons out.

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- For all practical purposes in a shuttle operation, we would cut that tanker off at the two-minute mark (having dumped 2900 gallons) and get that rig on the road to a refilling site.
- Why two minutes? Well it appears for that particular tanker that its water discharge significantly decreases after two-minutes of dumping.
- That specific decrease is attributed mainly to the decrease in head pressure inside the tank.

Determining Critical Dump Time

- So how do you determine your tanker's critical dump time?
- First you need to locate a set of certified truck scales capable of handling your tanker's fully loaded weight.
- Second, you need a location nearby the scale where you can dump water without creating a run-off problem.
- Third, you need a stop watch.

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- Fourth you need a piece of paper and pencil to record data.
- Fifth, you need a calculator (or someone who graduated high school and can do division and addition by hand).
- Sixth, you need someone who can drive the tanker on and off the scales safely and who can follow directions. (Please heed to the sixth need, we once had someone drive off the scale – off the side that is – that was not pretty!)

Determining Critical Dump Time

- Start with a fully loaded tanker. Weigh the rig and record the information.
- This is also a good time to check axle weights and compare them to the manufacturer's information. (We recommend the axle weight check – we have often found tankers with disproportionate axle weights and overloaded axle weights).

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- Next, drive the tanker off the scale and dump water for one minute using one of the dump chutes.
- Time starts on your signal and ends on your signal. For example – if the rig has electric dump valve switches in the cab, then when you say “go”, time starts and the driver operates a switch. At the one-minute mark you say “stop” and the driver operates the switch to close the valve.

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- Drive the rig back onto the scale and record the new weight value. Subtract the new weight from the original weight and you now have the amount of water (in pounds) that was dumped during that one minute time period.
- Divide that dumped weight by 8.35 and you will have the number of gallons dumped during that one minute time period.
- This division is based on the fact that most fresh water weights 8.35 pounds per gallon.
- We say “most” because some of us grew up in Western Pennsylvania where the contents of “fresh” water were questionable!

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- If your rig is a 1500-gallon rig then you may have dumped all of your water during this one dump. If you did not dump all of your water then you may want to dump for 30-seconds more and reweigh and calculate that dump.
- If your rig is 2000-gallons or larger, your second dump needs to be for a minute – then reweigh and calculate the quantity dumped during that minute.
- For rigs 3000-gallons and bigger – you may have to dump a third time.

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- Anyway – you get the idea. At some point you will see a significant drop-off in volume dumped and it is at that point that you should set the critical dump time.
- Once you have fine tuned the critical dump time, train all of your drivers and crews on the concept.
- We recommend installing a timer or stopwatch in the cab of your rig for use by the driver during dump and run operations.
- We also recommend that you complete the test for all of your dump options (side, rear, etc) so that you can maximize your dumping efficiency.
- As always, contact us with any questions or if you would like us to help test your tankers.

Determining Critical Dump Time



This 2000-gallon engine tanker stops with just its front axle on the scale. A weight reading is taken and the rig then pulls completely onto the scale.

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The front axle weight is recorded.

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All three axles are on the scale and the weight is recorded and compared to the listed GVW.

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The front axle is driven off of the scale and the rear axle weights are recorded.

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The engine tanker dumps for one-minute and then returns to the scale for a weight reading. (All axles are weighed together – there is no need to weigh the axles independently at this point.)

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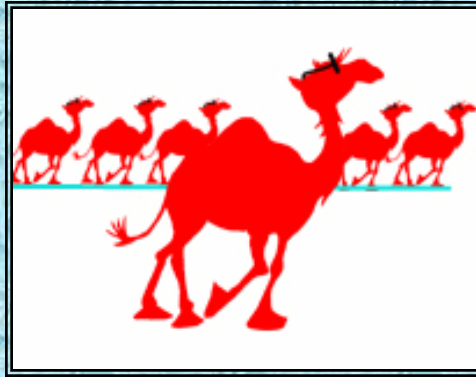


The weight is recorded and the tanker leaves the scale to go dump for another minute.

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The tanker dumps for another minute and then reweighs. The critical dump time for this 2000-gallon engine tanker was calculated at 90 seconds with a total off-load of 1800 gallons.



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