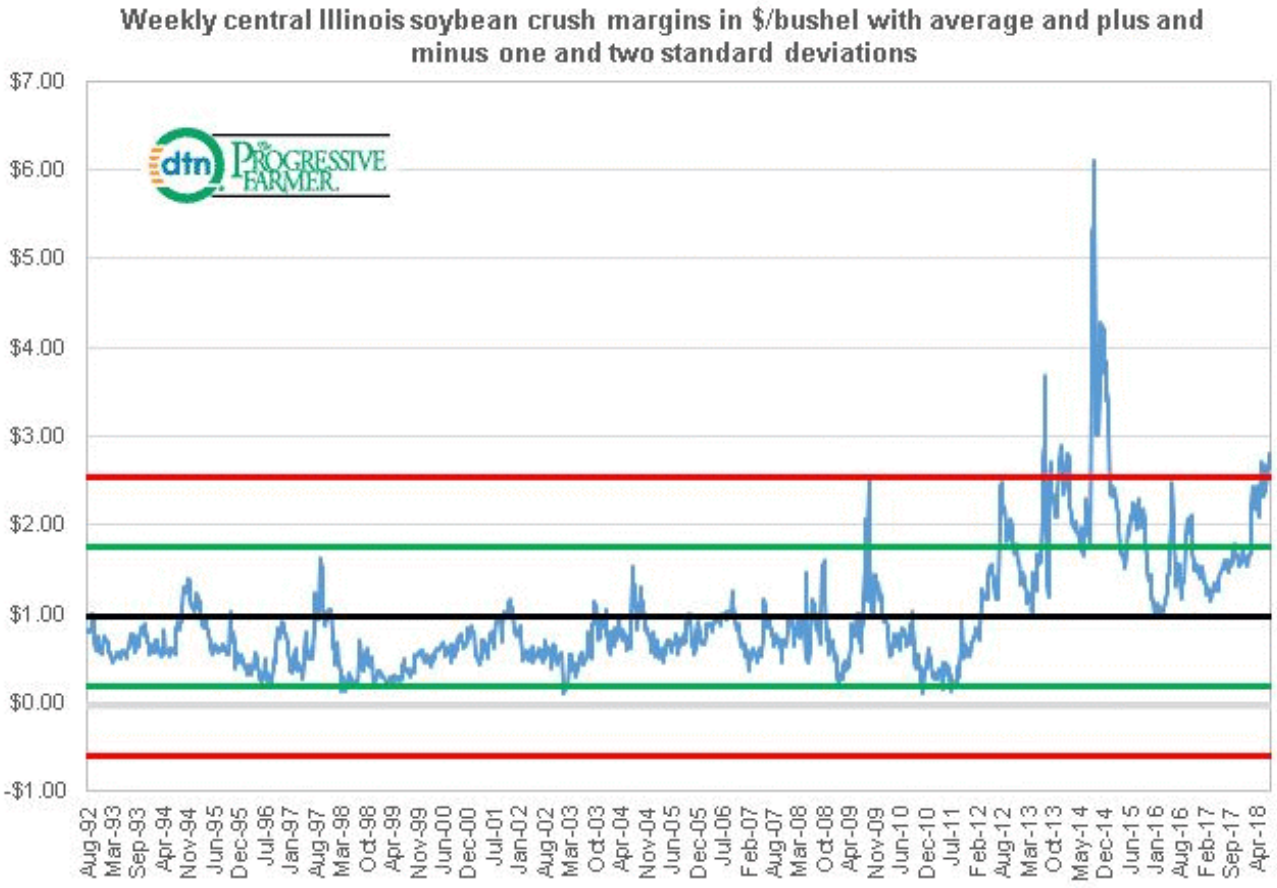

Gross Processing Margin (GPM) per bushel

$$\mathrm{GPM}(t,T) = 48\,\frac{\mathrm{FM}(t,T)}{2000\ \mathrm{lbs.}} + 11\,\frac{\mathrm{FO}(t,T)}{100\ \mathrm{lbs.}} - \mathrm{FS}(t,T)$$

where: $\mathrm{GPM}(t,T)$ is the per bushel gross processing margin observed at time t using CBOT futures contracts with maturity at time T ($T > t$), $\mathrm{FM}(t,T)$ is the associated price of meal, $\mathrm{FO}(t,T)$ is the price of oil, and $\mathrm{FS}(t,T)$ is the price per bushel of soybeans.

A 1988 USDA reports that crushing one bushel (60 lbs.) of soybeans yields 48 lbs. of meal, 11 lbs. of oil and 1 lb. of husks/waste. For the units of standardized CBT/CME contracts, this translates to **10 Soybeans – 12 Meal – 9 Oil**

For the prices in Trade 3 (Soy crush spread on Oct. 4, 2018)
(12 x $319.5 x 100) + (9 x 600 x $29.64) - (10 x 5000 x $8.9425) = $96,331
GPM/bushel = $96,331/50,000 bush. = $1.92662 / bushel.

Other Soycrush Ratios

It is possible for other Soycrush Ratios to be used –> depends on the type of soybeans, some produce more oil and less meal

The CME Soybean Crush Guide (p.7) (see BUS 419 webpage) uses 10 Soybean, 11 Soy Meal and 9 Soy Oil

The CME guide also discusses a Soybean Crush trade that uses 1 Soybean, 1 Meal and 1 Oil

The next page from most recent USDA publication on soybean markets has the soycrush production ratios as 1 bushel of soybeans (60 lbs.) producing 11.88 lbs. of oil and 46.50 lbs. of meal – the USDA publication provides the following proviso: "This table is provided for statistical purposes only and is not intended to indicate operating margins.

Examining the physical quantities underlying the contracts:

Weight of one CME soybean contract: (5000 bu.)(60 lbs) = 300,000 lbs.
Weight of one CME soy meal contract: (100 tons)(2000 lbs.) = 200,000 lbs.
Weight of one CME soy oil contract: 60,000 lbs.

Weight relation for 10 soybean /12 soy meal/9 soy oil

(300,000)(10) - (200,000)(12) - (60,000)(9) = 60,000 lbs. of husks

Weight relation of 10 / 11 / 9:

(300,000)(10) - (200,000)(11) - (60,000)(9) = 260,000 lbs. of husks

Weight relation of USDA ratio: 60 lbs. - 46.50 lbs. - 11.88 lbs. = 1.62 lbs.
For the CME 10 contract soybean position this translates to 81,000 lbs. of husks (with less meal and more oil)

GX_GR211
Springfield, IL Thu, Oct 04, 2018 USDA-IL Dept of Ag Market News

Soybean prices compared with value of oil and meal

		This week	Last week	Last year
	Unit	Oct 4, 2018	Sep 27, 2018	Oct 5, 2017
Soybean oil, crude tank cars & trucks Central IL.	¢/lb	29.49	28.74	31.63
Oil yield per bushel crushed	lb	11.88	11.88	11.88
Value from bushel of soybeans	$	3.50	3.41	3.76
48% Soybean Meal unrestricted, bulk Central IL.	$/ton	318.20	318.30	317.90
Meal yield per bushel crushed	lbs	46.50	46.50	46.50
Value from bushel of soybeans	$	7.40	7.40	7.39
Value of oil and meal from bushel of soybeans	$	10.90	10.81	11.15
No. 1 Yellow Soybeans truck price Central IL. points	$/bu	8.08	8.01	9.36
Difference between soybean price & value of oil & meal	$	2.82	2.80	1.79