

Red Angus Association of America Appendix

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FORMULAS

Age of Dam

Days	Age of Dam
To 1,003 days	2 year old
1,004 to 1,338 days	3 year old
1,339 to 1,703 days	4 year old
1,704 to 3,926 days	5 to 10 year old
3,927 days or over	11 years or older

Birth Weight Adjusted for Age of Dam

Birth Weight Adjusted for Age of Dam =
Actual Birth Weight + Age of Dam Additive

Age of Dam	Age of Dam Additive
2 year old	<i>plus 7 pounds</i>
3 year old	<i>plus 3 pounds</i>
4 year old	<i>plus 1 pounds</i>
5 to 10 years old	none
11 years or older	<i>plus 2 pounds</i>

Weaning Weight Adjusted To Age Of Dam

Weaning Weight Adjusted To Age Of Dam =
Actual Weaning Weight + Age of Dam Additive

Age of Dam	Age of Dam Additive	
	Male Calves	Female Calves
2 year old	<i>plus 74 pounds</i>	<i>plus 60 pounds</i>
3 year old	<i>plus 38 pounds</i>	<i>plus 30 pounds</i>
4 year old	<i>plus 16 pounds</i>	<i>plus 10 pounds</i>
5 to 10 years old	none	none
11 years or older	<i>plus 27 pounds</i>	<i>plus 25 pounds</i>

Weaning Weight Adjusted To 205 Days

$$\text{Pre-Weaning Gain} = (\text{Weaning Weight} - \text{Birth Weight}) \div \text{Age in Days}$$

$$\text{205 Day Adjusted Weight} = \text{Pre-Weaning Gain} \times 205 + \text{Birth Weight} + \text{Age of Dam Additive}$$

$$\text{E. T. Calves} = \text{Pre-Weaning Gain} \times 205 + \text{Birth Weight} = \text{205 Day Adjusted Weight}$$

Age of Dam	Age of Dam Additive	
	Male Calves	Female Calves
2 year old	<i>plus 74 pounds</i>	<i>plus 60 pounds</i>
3 year old	<i>plus 38 pounds</i>	<i>plus 30 pounds</i>
4 year old	<i>plus 16 pounds</i>	<i>plus 10 pounds</i>
5 to 10 years old	none	none
11 years or older	<i>plus 27 pounds</i>	<i>plus 25 pounds</i>

Yearling Weight Adjusted to 365 Days

$$\text{Post Weaning Average Daily Gain} = (\text{Final Wt.} - \text{Weaning Wt.}) \div \text{Number of Days Between Weights}$$

$$\text{Post Weaning Gain} = \text{Post Weaning Average Daily Gain} \times 160$$

$$\text{365 Day Adjusted Weight} = \text{Post Weaning Gain} + \text{205 Day Adjusted Weight}$$

Average Daily Gain (ADG)

Ratioed by sex within each contemporary group

$$\text{ADG} = (\text{Final Wt.} - \text{Weaning Wt.}) \div \text{Number of Days Between Weights}$$

Weight per Day of Age (WDA)

Ratioed by sex within each contemporary group

$$\text{WDA} = \text{Final Weight} \div \text{Calf Age}$$

Adjusted Birth Weight Ratio

$$\text{Adjusted Birth Weight Ratio} = (\text{Calf Adj. Birth Wt.} \div \text{Avg. Adj. Birth Wt. of contemp. group}) \times 100$$

Adjusted Weaning Weight Ratio

$$\text{Adjusted Weaning Weight Ratio} = (\text{Calf Adj. 205-Day Wt.} \div \text{Avg. Adj. 205-Day Wt. of contemp. group}) \times 100$$

Adjusted Yearling Weight Ratio

Adjusted Yearling Weight Ratio =
To adjust yearling weight ratio for selection on weaning weight (or culling of lighter calves at weaning), the following formula is used for computing yearling weight ratio:

$$\frac{W + P}{W_u + P_s} \times 100$$

Where,

W = adjusted 205-day weight of the individual

P = the 160-day postweaning gain of the individual calculated as follows:

160 x postweaning average daily gain

W_u = the average 205-day adjusted weight of all calves weaned contemporarily with the calf in question

P_s = the average 160-day postweaning gain of all calves tested in a contemporary sex-management group

When no calves are culled at weaning, the expression “W_u + P_s” in the above formula becomes the average of all animals in the sex management code group. The remainder of the formula remains the same for expressing the ratio of an individual animal as a percentage of its sex-management code group.

Pre-Weaning Gain Ratio

$$\text{Pre-Weaning Gain Ratio} = (\text{Calf Pre-Weaning Gain} \div \text{Avg. Pre-Weaning Gain of contemporary group}) \times 100$$

Average Daily Gain (ADG) Ratio

$$\text{Average Daily Gain Ratio} = \frac{\text{Calf ADG}}{\text{Avg. ADG of contemporary group}} \times 100$$

Weight per Day of Age (WDA) Ratio

$$\text{Adjusted Weaning Weight Ratio} = \frac{\text{Calf WDA}}{\text{Avg. WDA of contemporary group}} \times 100$$

Adjusted Yearling Scrotal Circumference

$$\text{Adjusted yearling scrotal circumference} = \text{Actual Scrotal Measurement} + [(365 - \text{age in days at time of measurement}) \times .0324]$$

MOST PROBABLE PRODUCING ABILITY (MPPA)

MPPA for weaning weight index is computed by the following formula:

$$\text{MPPA} = H + \frac{NR}{1 + (N - 1)R} \times (C - H)$$

where H = 100, the herd average weaning weight ratio,
N = No. of calves included in the cow's average,
R = Repeatability factor for weaning weight ratio, 0.4
and C = Average weaning weight ratio for all calves the cow has produced.

FORMULAS FOR ULTRASOUND

Adjusted Ultrasound Rump =

Actual rump + (0.000472) (365 – age in days) / weight per day of age (WDA)

Ultrasound Rump Ratio =

(Adjusted rump / average adjusted rump for the contemporary group) x 100

Adjusted Ultrasound Rib Fat =

Actual rib fat + (0.000472) (365 – age in days) / weight per day of age (WDA)

Ultrasound Rib Fat Ratio =

(Adjusted rib fat / average adjusted rib fat for contemporary group) x 100

Adjusted Ultrasound Ribeye Area =

Actual ribeye area + (0.004955) (365 – age in days) / weight per day of age (WDA)

Ultrasound Ribeye Area Ratio =

(Adjusted ribeye area / average adjusted ribeye area for contemporary group) x 100

Adjusted Percentage Intramuscular Fat =

Actual intramuscular fat + (0.002) (365 – age in days) / weight per day of age (WDA)

Ultrasound Percentage Intramuscular Fat Ratio =

(Adjusted intramuscular fat / average intramuscular fat for contemporary group) x 100

REGISTRATION CODES

Dam's Disposal Code

The following codes are to be used for dams that died or were disposed for a reason.

- 9 = Died due to age
- 10 = Culled – physical defect
- 11 = Culled – fertility
- 12 = Culled due to performance or productivity
- 13 = Culled due to temperament
- 14 = Culled due to age
- 15 = Culled – other including sold but not transferred

Dam's Reason Codes

- 1 = Open, missed calving opportunity
- 2 = ET program / donor dam
- 3 = Moved to next calving season
- 4 = ET program / recipient cow
- 5 = Aborted / premature – use this reason code for cow rather than disposal for calf

Calf's Disposal Code

The following codes are to be used for calves that died prior to weaning or before yearling. Please use the number listed below that corresponds to the reason for the disposal.

- 2 = Stillborn/full term
- 3 = Died at birth due to a birth defect
- 4 = Died at birth for other reasons
- 5 = Born alive, but died before weaning due to disease
- 6 = Born alive, but died before weaning due to other reasons
- 7 = Died after weaning due to disease
- 8 = Died after weaning due to other reasons

Calf's Twin Code

- 1 = single calf
- 2 = twin to bull
- 3 = twin to heifer
- 4 = other

Registration Status

- R** Register Now
- I** Incomplete
- H** On Hold
- C** Compute
- Z** Blood/DNA

Calving Ease

- 1 = No difficulty, no assistance
- 2 = Minor difficulty, some assistance
- 3 = Major difficulty, usually mechanical assistance
- 4 = Caesarean section or other surgery
- 5 = Abnormal presentation

Category

- A = **1A**: 100% Red Angus, no disqualifying features
- B = **1B**: 87% to and including 100% Red Angus blood content, no disqualifying features
- 2 = **II**: Equal to or greater than 87% up to and including 100% Red Angus blood content having one or more disqualifying characteristics
- 3 = **III**: Less than 87% Red Angus blood content

Color

- 1 = Solid Red
- 3 = Black skin pigment
- 4 = Ineligible white
- 5 = Any other
- 8 = Black hair coat

Dam's Body Condition Score – explanations on AP-12

THIN	BORDERLINE	OPTIMUM/MODERATE	FAT
1 = Emaciated	4 = Borderline	5 = Moderate	7 = Good
2 = Poor		6 = High moderate	8 = Fat
3 = Thin			9 = Extremely fat

Feed Code

- 1 = No creep feed was given to the calf
- 2 = Creep feed was available to the calf
- 3 = Foster dam or bottle/bucket fed

HPS Code

- H = Horned
- P = Polled
- S = Scurred

Mating Code

- 1 = Artificial Insemination—A.I. Certificate required if non-owned bull is used
- 2 = Natural Service
- 3 = Embryo Transplant—Embryo Transplant Certificate required

Sex Of Calf

- 1 = Bull
- 2 = Heifer
- 3 = Steer

SYSTEM OF BODY CONDITION SCORING (BCS) FOR BEEF CATTLE

Condition	BCS	Description
Thin	1	Emaciated – Cow is extremely emaciated with no palpable fat detectable over spinous processes, transverse processes, hipbones, or ribs. Tail-head and ribs project quite prominently
	2	Poor – Cow still appears somewhat emaciated by tail-head and ribs are less prominent. Individual spinous processes are still rather sharp to the touch, but some tissue cover over dorsal portion of ribs
	3	Thin – Ribs are still individually identifiable but not quite as sharp to the touch. There is obvious palpable fat along spine and over tail-head with some tissue cover over dorsal portion of ribs.
Borderline	4	Borderline – Individual ribs are no longer visually obvious. The spinous processes can be identified individually on palpation but feel rounded rather than sharp. Some fat cover over ribs, transverse processes, and hipbones
Optimum/ Moderate	5	Moderate – Cow has generally good overall appearance. On palpation, fat cover over ribs feels spongy and areas on either side of tail-head now have palpable fat cover
	6	High Moderate – Firm pressure now needs to be applied to feel spinous processes. A high degree of fat is palpable over ribs and around tail-head.
Fat	7	Good – Cow appears fleshy and obviously carries considerable fat. Very spongy fat cover over ribs and around tail-head. In fact, “rounds” or “pones” beginning to be obvious. Some fat around vulva and in crotch.
	8	Fat – Cow very fleshy and over-conditioned. Spinous processes almost impossible to palpate. Cow has large fat deposits over ribs and around tail-head and below vulva. “Rounds” or “pones” are obvious.
	9	Extremely fat – Cow obviously extremely wasty and patchy and looks blocky. Tail-head and hips buried in fatty tissue and “rounds” or “pones” of fat are protruding. Bone structure no longer visible and barely palpable. Large fatty deposits might even impair animal’s mobility.

INTERNATIONAL BIRTH YEAR CODES

1990 = Z	2001 = L	2010 = X
1991 = A	2002 = M	2011 = Y
1992 = B	2003 = N	2012 = Z
1993 = C	2004 = P	2013 = A
1994 = D	2005 = R	2014 = B
1995 = E	2006 = S	2015 = C
1997 = G	2007 = T	2016 = D
1998 = H	2008 = U	2017 = E
1999 = J	2009 = W	2018 = F
2000 = K		

The letters I, O, Q, and V are not used.

NOTE: International letters are designated for each year of birth. This option is easy to use in conjunction with numbers. For example, M001 and M002 might be used to indicate the first and second calf born in the year 2002.

BREED ASSOCIATION CODES

National Association of Animal Breeders (NAAB) — 2002

Africander	AF	Eringer	ER	Parthenaise	PA
Angus	AN	Flamand	FA	Piedmontese	PI
Ankina	AK	Flordia Cracker	FC	Pinzgauer	PZ
Ankoke-Watusi	AW	Fribourg	FR	Ranger	RA
American Breed	AE	Galloway	GA	Red Angus	AR
Amerifax	AM	Gelbray	GE	Red Brahman	RR
Barzona	BA	Gelbvieh	GV	Red Brangus	RB
Bonsmara	BO	Gronningen	GR	Red Dane	RD
Beefalo	BE	Guzera	GZ	Red Poll	RP
Beef Frieson	BF	GRY (Gir)	GY	Romagnola	RN
Beefmaster	BM	Hays Converter	HC	Romosinuano	RS
Belgian Blue	BB	Hereford (Horned)	HH	Rotbunte	RO
Belted Galloway	BG	Hereford (Polled)	HP	Sahiwal	SW
Blonde d'Aquitaine	BD	Highland (Scotch)	SH	Salers	SA
Braford	BO	Hybrid (Alberta)	HY	Santa Gertrudis	SG
Brahman	BR	Indu Brazil	IB	Senapol	SE
Brahmousin	BI	Kobe (Wagyu)	KB	Shorthorn (Beef Scotch)	SS
Braler	BL	Limousin	LM	Shorthorn (Polled)	SP
Brangus	BN	Lincoln Red	LR	Shorthorn (Illwara)	IS
Braunvieh	BU	Lowline	LO	Simbrah	SI
British White	BW	Luing	LU	Simmental	SM
Brown Swiss (Beef)	SB	Maine-Anjou	MA	South Devon	DS
Buelingo	BQ	Mandalong Special	ML	Sussex	SX
Candienne	CN	Marchigiana	MR	Tabapua	TB
Charbray	CB	Maremmana	ME	Tarantaise	TA
Charolais	CH	Mashona	MH	Taurindicus	TN
Chi-Angus	CG	Mexican Corriente	MC	Texas Longhorn	TL
Chianina	CA	Muese-Rhine-Issel	MI (MRI)	Tuli	TI
Chi-Maine	CM	Murrah	MU	Welsh Black	WB
Danish Red & White	RW	Murray Grey	MG	West Flemish Red	WF
Devon	DE	Nellore	NE	White Park	WP
Dexter	DR	Normande	NM	Crossbreeds	XX
Dutch Blend	DL	Norwegian Red	NR	Crossbreeds (Twiner)	XT

BULL HIP HEIGHT (INCHES) FRAME SCORE

Age in Months	Frame Score								
	1	2	3	4	5	6	7	8	9
5	33.5	35.5	37.5	39.5	41.6	43.6	45.6	47.7	49.7
6	34.8	36.8	38.8	40.8	42.9	44.9	46.9	48.9	51.0
7	36.0	38.0	40.0	42.1	44.1	46.1	48.1	50.1	52.2
8	37.2	39.2	41.2	43.2	45.2	47.2	49.3	51.3	53.3
9	38.2	40.2	42.3	44.3	46.3	48.3	50.3	52.3	54.3
10	39.2	41.2	43.3	45.3	47.3	49.3	51.3	53.3	55.3
11	40.2	42.2	44.2	46.2	48.2	50.2	52.2	54.2	56.2
12	41.0	43.0	45.0	47.0	49.0	51.0	53.0	55.0	57.0
13	41.8	43.8	45.8	47.8	49.8	51.8	53.8	55.8	57.7
14	42.5	44.5	46.5	48.5	50.4	52.4	54.4	56.4	58.4
15	43.1	45.1	47.1	49.1	51.1	53.0	55.0	57.0	59.0
16	43.6	45.6	47.6	49.6	51.6	53.6	55.6	57.5	59.5
17	44.1	46.1	48.1	50.1	52.0	54.0	56.0	58.0	60.0
18	44.5	46.5	48.5	50.5	52.4	54.4	56.4	58.4	60.3
19	44.9	46.8	48.8	50.8	52.7	54.7	56.7	58.7	60.6
20	45.1	47.1	49.1	51.0	53.0	55.0	56.9	58.9	60.9
21	45.3	47.3	49.2	51.2	53.2	55.1	57.1	59.1	61.0

Frame Score =

$$-11.548 + 0.4878 (\text{Ht.}) - 0.0289 (\text{Days of Age}) + 0.00001947 (\text{Days of Age})^2$$

$$+ 0.0000334 (\text{Ht.}) (\text{Days of Age})$$

HEIFER HIP HEIGHT (INCHES) FRAME SCORE

Age in Months	Frame Score								
	1	2	3	4	5	6	7	8	9
5	33.1	35.1	37.2	39.3	41.3	43.4	45.5	47.5	49.6
6	34.1	36.2	38.2	40.3	42.3	44.4	46.5	48.5	50.6
7	35.1	37.1	39.2	41.2	43.3	45.3	47.4	49.4	51.5
8	36.0	38.0	40.1	42.1	44.1	46.2	48.2	50.2	52.3
9	36.8	38.9	40.9	42.9	44.9	47.0	49.0	51.0	53.0
10	37.6	39.6	41.6	43.7	45.7	47.7	49.7	51.7	53.8
11	38.3	40.3	42.3	44.3	46.4	48.4	50.4	52.4	54.4
12	39.0	41.0	43.0	45.0	47.0	49.0	51.0	53.0	55.0
13	39.6	41.6	43.6	45.5	47.5	49.5	51.5	53.5	55.5
14	40.1	42.1	44.1	46.1	48.0	50.0	52.0	54.0	56.0
15	40.6	42.6	44.5	46.5	48.5	50.5	52.4	54.4	56.4
16	41.0	43.0	44.9	46.9	48.9	50.8	52.8	54.8	56.7
17	41.4	43.3	45.3	47.2	49.2	51.1	53.1	55.1	57.0
18	41.7	43.6	45.6	47.5	49.5	51.4	53.4	55.3	57.3
19	41.9	43.9	45.8	47.7	49.7	51.6	53.6	55.5	57.4
20	42.1	44.1	46.0	47.9	49.8	51.8	53.7	55.6	57.6
21	42.3	44.2	46.1	48.0	50.0	51.9	53.8	55.7	57.7

Frame Score =

$$-11.7086 + 0.4723 (\text{Ht.}) - 0.0239 (\text{Days of Age}) + 0.0000146 (\text{Days of Age})^2 + 0.0000759 (\text{Ht.}) (\text{Days of Age})$$