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Investigating and improving market compliance issues in beef markets in central Queensland

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Abstract

Beef cattle producers involved with the Rolleston CQ BEEF group identified market compliance as an area which could be improved within their beef businesses. An UltrAmac® fat depth scanner was purchased to objectively measure fat depth at the P8 site before cattle were sent to the abattoir.

The overall EU compliance rate was very good at 87 percent with the main cause for non- compliance being P8 fat (6.5%) and meat colour (3.9%). The MSA grading was 60 percent. A further 22 percent which met MSA grading failed to meet abattoir specifications mainly due to dentition and Hot Standard Carcase Weight (HSCW). Management to improve compliance rates could be relatively simple. The fat scanner proved to be a very useful tool for making the decision of which cattle are ready to sell.

Executive summary

Members of the Rolleston CQ BEEF group participated in a comprehensive business and situation analysis to identify opportunities for improvement in their businesses. A common issue and interest that arose from this analysis was optimising market compliance to maximise returns.

Four property owners participated in the PDS by collecting data on mobs of cattle consigned to various abattoirs during the project. Background data was collected on each mob in the yards before transport to slaughter using a Yard Booklet developed to provide a standard measurement procedure. Data collected included: individual animal identification, sex, year brand, weight, breed, dentition and P8 fat depth (using the UltrAmac® fat depth scanner purchased as part of the project).

Carcase grading data was collated from the four properties and analysed for compliance to either the EU or MSA market. The overall measured EU compliance rate (from 2010-2012) was very good at 87 percent, however, problems with data reporting meant only one-third of the 1169 carcases had full data to analyse. The remaining two-thirds did not have data for all six EU carcase traits; however, there was enough information to look at each trait individually. P8 fat, dentition and meat colour were the main causes for non-compliance.

Carcases consigned for MSA grading (4,109) managed 60 percent compliance to receive a premium. However, a further 22 percent of carcases, which met MSA requirements, failed to meet company specifications and consequently did not receive a MSA premium, mostly due to dentition and carcase weight. Therefore, some relatively simple management changes to meet the dentition and carcase weight could be looked at.

Of the carcases that complied with processors' P8 fat specifications, 97 percent (EU) and 96 percent (MSA) had UltrAmac® live fat scan measurements that met specifications. A regression of ultrasound fat versus abattoir measured fat showed evidence of a linear relationship with 53 percent (r=0.53) and 51 percent (r=0.51) of the variation in abattoir P8 fat depth explained by scan P8 fat depth for EU and MSA data respectively.

Scanning technique is very important as marked fat depth differences can be found within a small area on the rump, making it imperative that the P8 site is consistently identified correctly. It is also critical that the scanner applies the right amount of pressure so as not to compress the fat and give a lower reading. When used correctly, the fat scanner proved to be a very useful tool for making informed decisions on which cattle were ready to sell. It gave the user the ability to objectively measure whether an animal met the P8 fat depth specifications on the day. If previous fat measurements are available these can be considered along with weight data, seasonal conditions and the market when deciding whether it is worth retaining an animal to put more fat on.

In terms of the management strategies that the four properties employed to meet market specifications, the main change they made was to increase their use of the fat scanner. This change may not have been reflected in the P8 fat depth compliance results, however, it has proven to be a very useful tool for decision-making and attitude towards the fat scanner has changed markedly over the course of the PDS.

For beef cattle producers actively managing their cattle to reduce stress and provide adequate nutrition prior to slaughter, the findings from this project may help them to maximise their market compliance through consideration of external factors. These external factors include curfew times, and transport distance.

Unfortunately, inconsistencies in carcase feedback formats from different abattoirs created problems with analysing data. A standardised feedback system would make monitoring carcase data more useable. In addition, retrieval of carcase data from producers to use in the project analysis proved problematic.

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1. Background

The CQ BEEF project was launched mid-2007 as a partnership between the Fitzroy Basin Association (FBA), the Cooperative Research Centre for Beef Genetic Technologies (Beef CRC) and the Department of Agriculture, Fisheries and Forestry, (formerly the Department of Primary Industries and Fisheries). The project evolved around setting up producer-driven beef groups in Central Queensland. The idea of the groups was to assist families to assess the physical and financial performance of their enterprises and identify opportunities for improvement.

The Rolleston CQ BEEF group was founded in August 2008 and in October of that year the group members conducted their first individual business analysis using ProfitProbe™ (a benchmarking program designed by Resource Consulting Services). The results from that analysis were discussed at a meeting in December 2008. When identifying each business' strengths and weaknesses, some common issues arose. One of these issues that group members were particularly interested in was market compliance.

Large numbers of animals often fail to meet optimum market specifications and producers can lose five to 80 cents per kilogram dressed weight. There is huge potential in any beef business to improve gross margins by receiving premiums for animals that comply with all market specifications. At times EU premiums can be around 40 cents per kilogram. This PDS project is about understanding what proportion and why some carcases do not meet specifications. It will then identify issues with non-compliance and suggest strategies to improve.

2. Project objectives

2.1 Objectives

1. Investigate compliance issues for cattle sent to different target markets (for example MSA, EU, Jap Ox) and identify opportunities to improve compliance.
2. Trial the use of an UltrAmac® Fat Depth Scanner for Beef cattle in relation to individual animal compliance and commercial usability.
3. Provide opportunities for technical support and training activities as a group and also to the wider public.
4. Share knowledge and experience gained with other producer groups and the wider beef community.

2.2 Outcomes

1. Improved knowledge, skills and understanding of market compliance in a variety of markets
2. Benchmark knowledge and practice change
3. Improved profitability of participating businesses.

2.3 Physical outputs

1. Create a booklet of protocols for this PDS. The booklet should be suitable for quick reference at the yards when collecting data such as fat scanning protocol, condition scoring, F.NIRS sampling protocol, determining dentition, etc.
2. Economic case studies - The cost benefit of accurately measuring fat depth for improved market compliance.

An additional output of the PDS will be feedback for the manufacturer of the UltrAmac® fat scanner. The producers that used the scanner regularly have suggested a number of possible improvements in the design of the scanner as well as tips for future users that will help achieve a more reliable and repeatable result.

3. Methodology

3.1 Locality

The four main properties involved in data submission for the PDS were Bottle Tree Downs, Bundaleer, Lowesby and Springwood. These property owners (along with rest of the Rolleston CQ BEEF group members), were actively involved in the initial process and development of the project objectives and methodology as well as the ongoing reassessment of outcomes and project direction.

Bottle Tree Downs is owned by Tim and Trina Patterson, and located south west of Rolleston. The 5,296 ha property runs a breeding and fattening operation along with some cropping. Bundaleer belongs to Matthew and Maryellen Peart and is located in the Arcadia Valley. Their 3,814 ha are dedicated to a certified organic EU rotationally grazed breeding and fattening herd. Ian and Kate McCamley own Lowesby (4,448 ha), located just north of Rolleston. Ian and Kate run a steer trading operation under the name MCC Pastoral and also own and lease several other properties (some of them EU accredited). Springwood is a 29,842 ha property owned by the Tyson family. Lindsay and Avriel Tyson, in partnership with their daughter Jeanette, son Douglas and his wife Tahnee run breeders and sell cattle direct to the works where possible. Some store cattle are sold privately and others go through the sale yard depending on the season.

3.2 Data recorded

The collection and submission of data was a voluntary process and in line with the cooperating property's current management practices.
The data that was collected in the yards prior to transport included:

- Animal identification (EID)
- Sex
- Weight
- Year brand
- Breed
- Dentition (some mobs)
- Fat depth measured with ultrasound scanner
- Comments and other relevant information that might affect compliance.

For each mob sent to the abattoir, the owner/manager of the cattle completed a survey (Appendix 7.1) to capture pre-slaughter details of the animals' management in the lead-up to slaughter.

The owner/manager of each mob sent to slaughter submitted the kill sheet and MSA feedback (if the animals were consigned to MSA) along with the live animal data and pre-slaughter survey to the project coordinator for compiling.

The data from each property was compiled in a series of Excel™ spreadsheets and analysed by contractor Don Menzies at Universal Resource Management; and the statistical analysis was carried out by David Reid at the Department of Agriculture, Fisheries and Forestry.

4. Results

Compliance issues were investigated on four properties with cattle being consigned to either the EU or MSA markets.

4.1 Compliance with the EU market

Market specifications

The target carcase specifications used to determine EU compliance can be seen in Table 1. Between June 2010 and June 2012, 1,169 EU eligible carcases were included in the data collection process for this project (Table 2).

Table 1. EU market carcase specifications

Carcase trait	Min	Max
Dentition (teeth)	0	4
HSCW (kg)	240	420
P8 fat depth (mm)	6	22
Bruising score	0	0
Meat colour score	1B	4
Fat colour score	0	4

Table 2. Number of mobs of cattle consigned to EU market by properties A and B

Property	2010	2011	2012	Total
Property A	5	1	4	10
Property B		1		1
Total	5	2	4	11

Of the 1169 carcases submitted, full EU compliance carcase data was only available for 384. A major problem encountered was the lack of a standard abattoir feedback system, making it challenging to collate the data in a single format for analysis. The information was not only difficult to interpret, there seemed to be cases where full feedback information was not supplied to the producer, and in many cases the producer did not supply the information to the project coordinator. Attempts to retrieve the missing information were unsuccessful.

The EU carcase results and factors affecting compliance are evaluated in two sections:
1. Carcases with full data (384 carcases)
2. Carcases with partial data (785 carcases).

EU carcases with full data

Of the 384 carcases which had full compliance data, 334 (87%) met all trait specifications and were graded as EU. Of the fifty carcases (13%) that failed to meet the specifications for one or more traits; P8 fat depth was the main reason for non-compliance (6.5% of carcases), followed by meat colour (3.9%), dentition (2.1%), fat colour (0.8%) and bruising (0.3%) (Figure 1). All carcases were in the required carcase weight range.

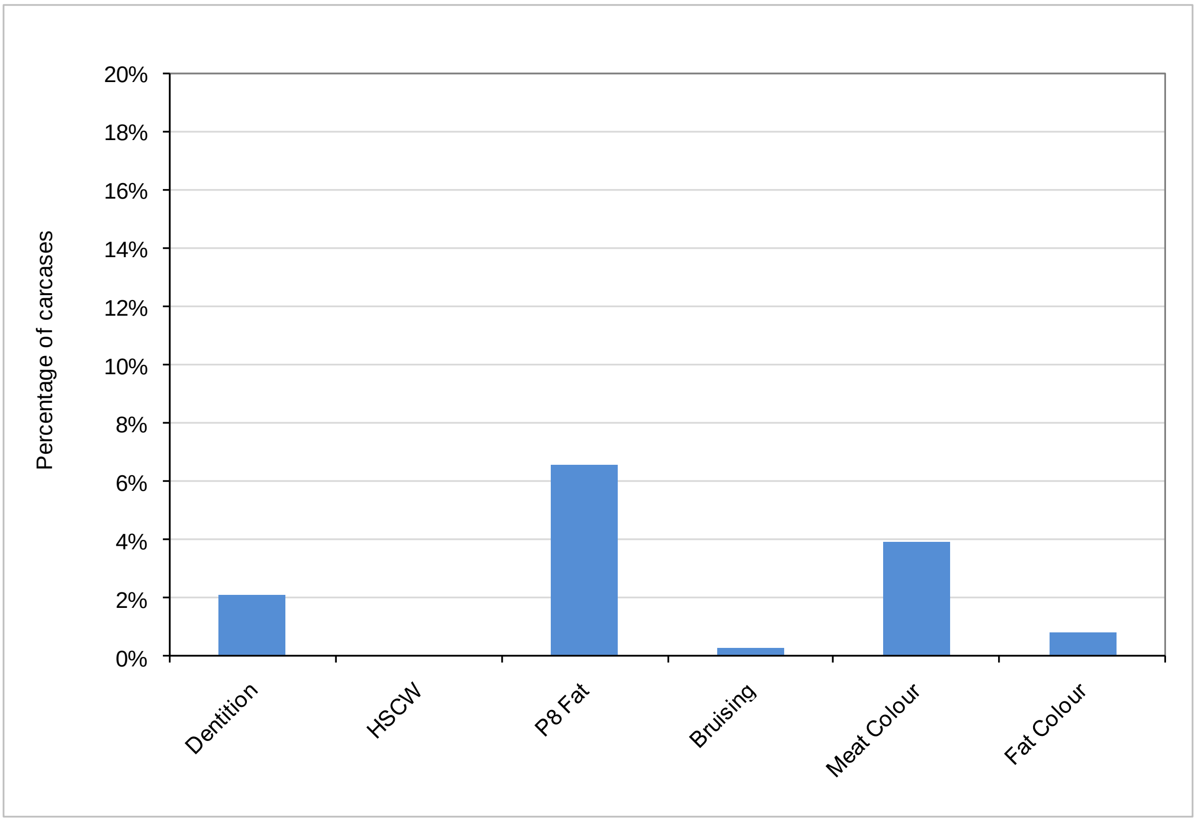


Figure 1. Reasons for non-compliance with EU market specifications (carcases with data for all six specification traits)

EU carcases with full and partial data

Table 3 shows all carcase data supplied over the three years. Where a carcase was missing information for one or more traits, compliance to individual traits was assessed. For example, there was dentition information on 843 carcases; 74 (9%) did not comply and seemed to be a major factor.

Table 3. Compliance to individual EU carcase traits

Carcase trait	Cattle with trait data	Number of head non-compliant	Percentage non-compliant
Dentition	843	74	9%
HSCW	843	21	2%
P8 fat depth	1156	47	4%
Bruising score	1169	7	1%
Meat colour score	710	41	6%
Fat colour score	711	4	1%

Figure 2 shows the trait data for each of the three years. It appears carcases supplied in 2011 were the main problem, falling outside the range for both dentition and HSCW. This seemed to show a decline in compliance (albeit slight) over the three years.

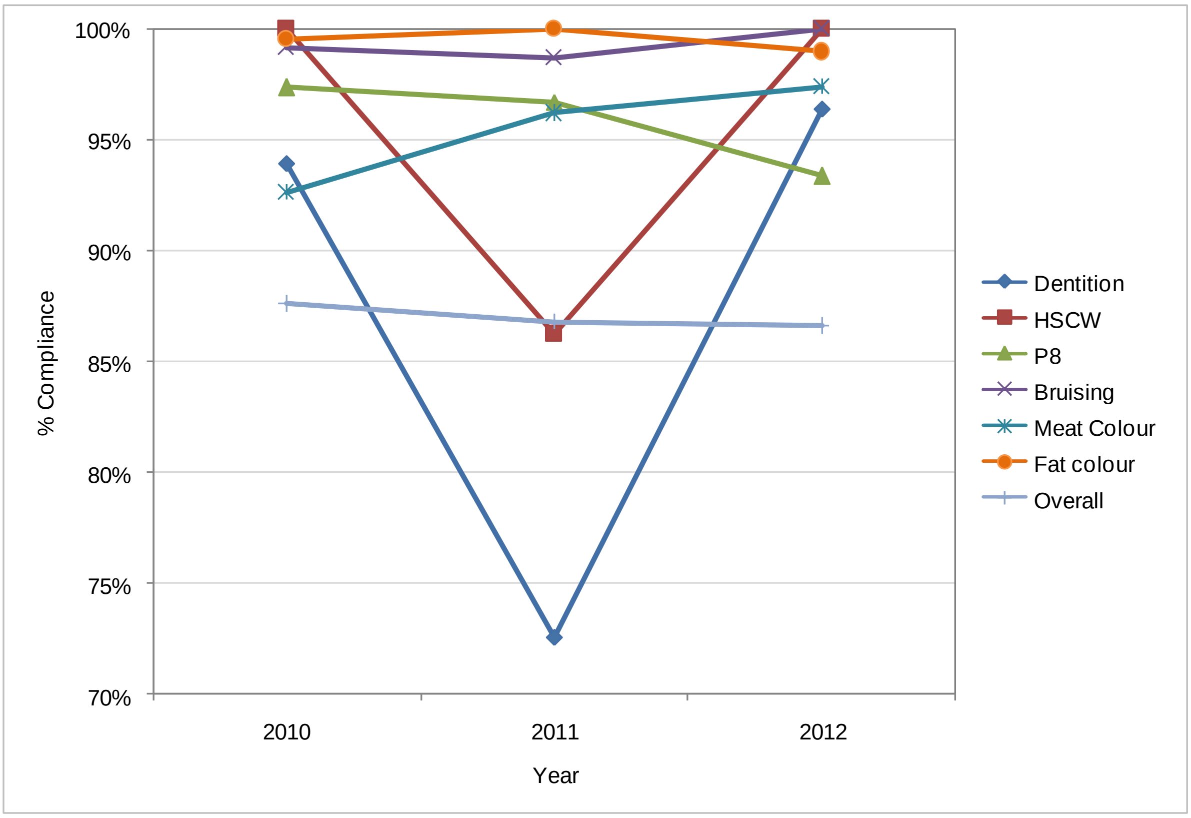


Figure 2. EU individual and overall trait compliance by year

4.2 Compliance to the MSA market

Market specifications

Between June 2010 and June 2012, data was collected on 4,109 carcases targeted at the MSA market.

The carcase specifications used to determine MSA and plat/company specifications are shown below.

Table 4. MSA requirements

Carcase trait	Min	Max
Meat colour	1B	3
pH	5.3	5.7
Rib fat (mm)	3.0	

Table 5. Other criteria that contribute to MSA grading

Carcase trait	Min	Max
Marbling	0	9
MSA marbling	100	1190
Ossification score	100	590
Hump height (mm)	0	

Table 6. Plant/company specifications for MSA grading

Carcase trait	Min	Max
Dentition (teeth)	0	4
HSCW (kg)	180	340
P8 fat depth (mm)	6	22
Bruising	0	0
Rib fat (mm)	3	20

MSA graded carcases are assigned a grade code based on their ability to meet specifications. A carcase can receive multiple grade codes if it fails to meet more than one specification.

Table 7. MSA grading codes

Grade code	Meaning
0	Met MSA grading requirements
1	Subcutaneous fat depth outside specification
3	Inadequate Fat distribution
4	pH 5.71 or above
5	Meat colour 1a or greater than 3
6	Met MSA requirements but does not meet company requirements
7	Miscellaneous (e.g. bruising, ecchymosis)
8	Aus-Meat
9	Hide puller damage greater than 100 cm^2 on a single primal

Of the 4,109 carcases, 2,477 (60%) complied with both MSA and abattoir specifications and therefore received a premium price. Twenty-two percent of carcases (902) met MSA specifications but failed to meet company specifications (Figure 3); and 730 (18%) met company specifications but failed to meet MSA specifications. Ninety six percent (96%) of the carcases consigned were HGP free.

Dentition and HSCW were the main reasons for non-compliance with company specifications. This indicates there are opportunities to improve compliance rates through management and selection of sale animals.

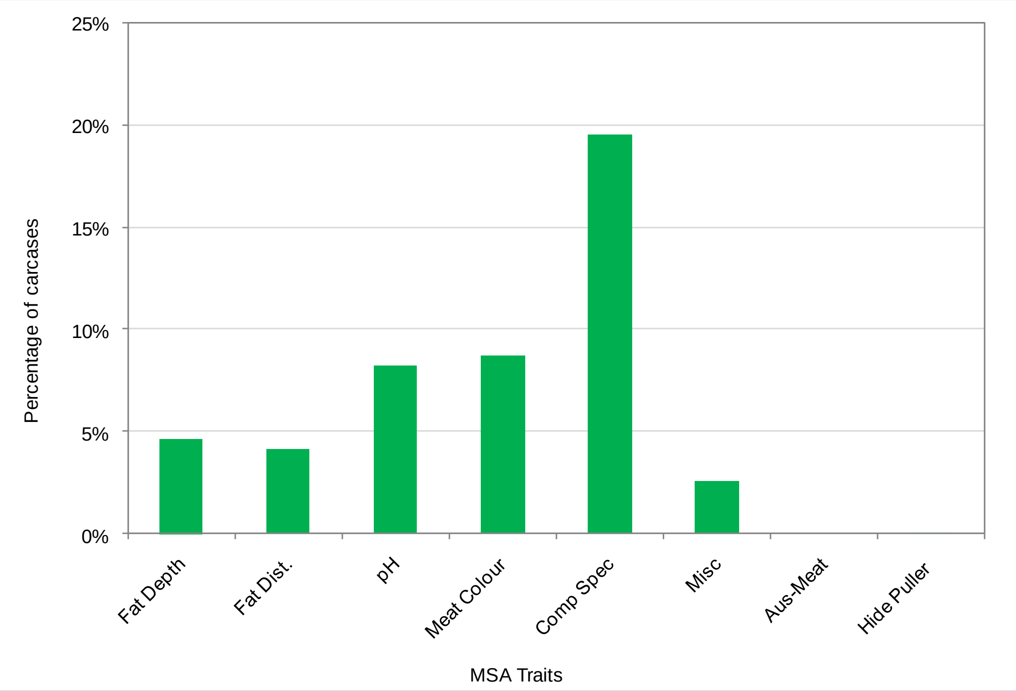


Figure 3. Reasons for MSA non-compliance

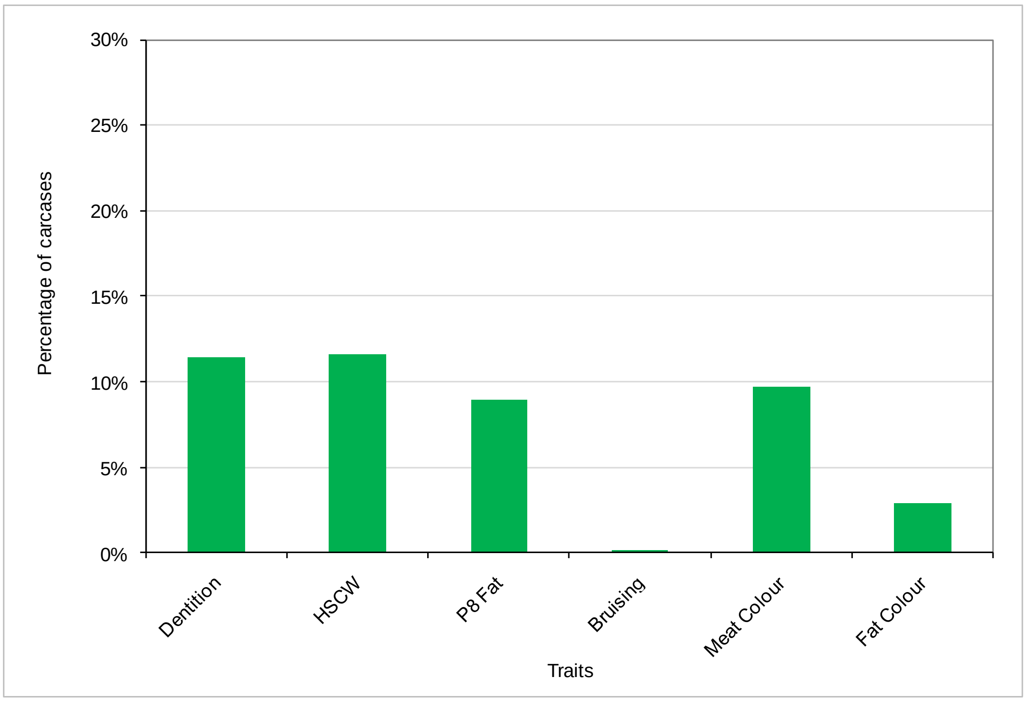


Figure 4. Reasons for non-compliance with company/plant specifications (Grade code 6)

Carcases that meet MSA specifications (MSA grade codes of zero or six) are assigned a boning group number between one and 18, with one having the highest eating quality. Carcases that fail to meet MSA specifications (MSA grade code of 1-5 or 7-9) receive a U (ungrade) as their boning group. Figure 5 shows a breakdown of the MSA boning groups for the 4,109 carcases consigned to the MSA market. Figure 6 shows the reasons for ungraded carcases.

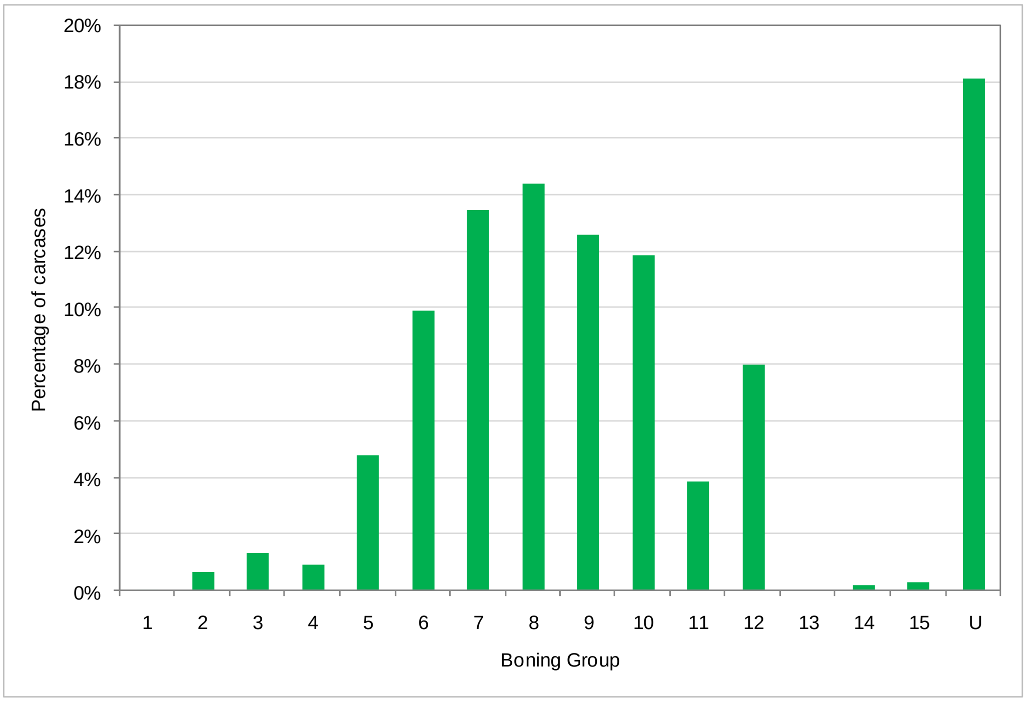


Figure 5. Distribution of carcases across MSA boning groups

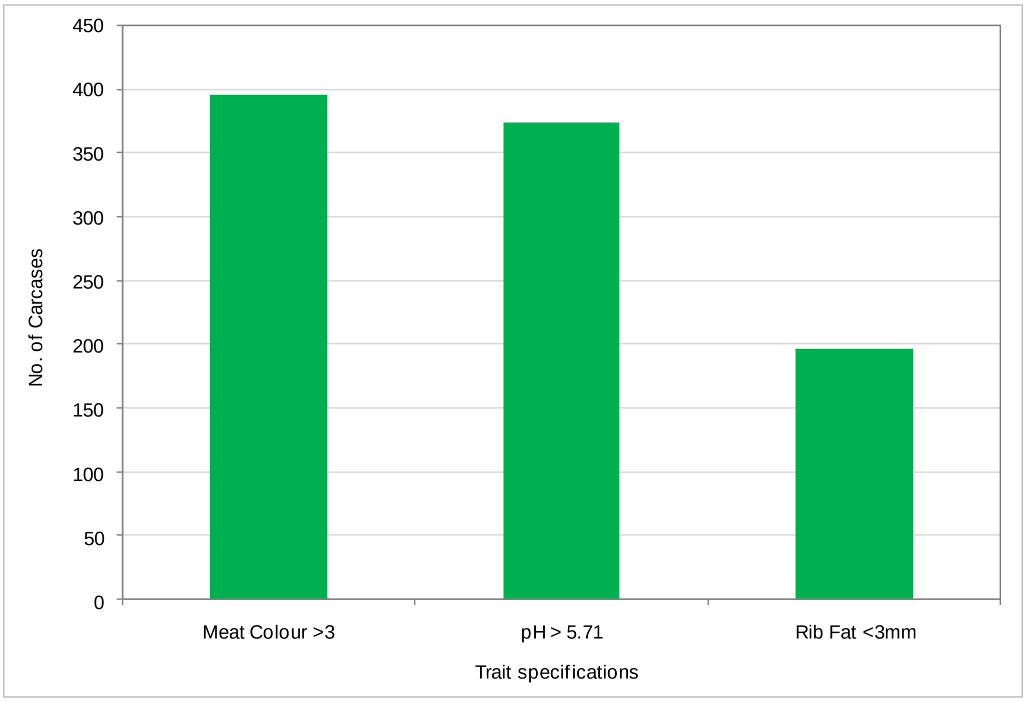


Figure 6. Reasons for carcases classified as boning group U

Figure 7 shows the boning group breakdown of carcases with grade code 6 (those that met MSA specifications but failed to meet company specifications). There were 902 head that failed company specifications. Of those, 78 carcases were in the top 5 boning groups, 675 were in boning groups 6-10 and 134 in boning groups 11-15.

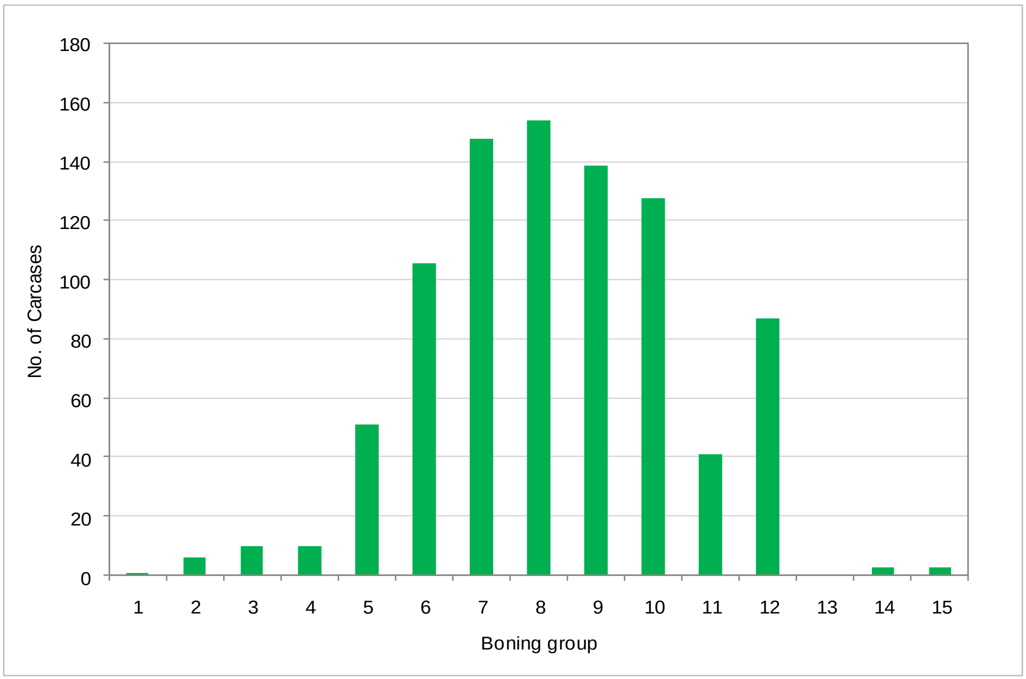


Figure 7. Breakdown of MSA boning groups assigned to carcases that failed to meet company specifications (grade code 6)

Figure 8 shows the compliance rate for each MSA trait by year and overall (i.e. those animals that complied with all trait specifications for each year). As with the EU data, the individual trait compliance was calculated using all carcases that had data for that particular trait for each year of the project. Grade codes were used to determine the carcases that met all MSA and company specifications as well as those that met all MSA specs regardless of company specifications. The data showed a similar dentition trend to the EU data, where in 2011 dentition compliance dropped, most likely because of carrying over steers for an extra year following a poor year in 2009.

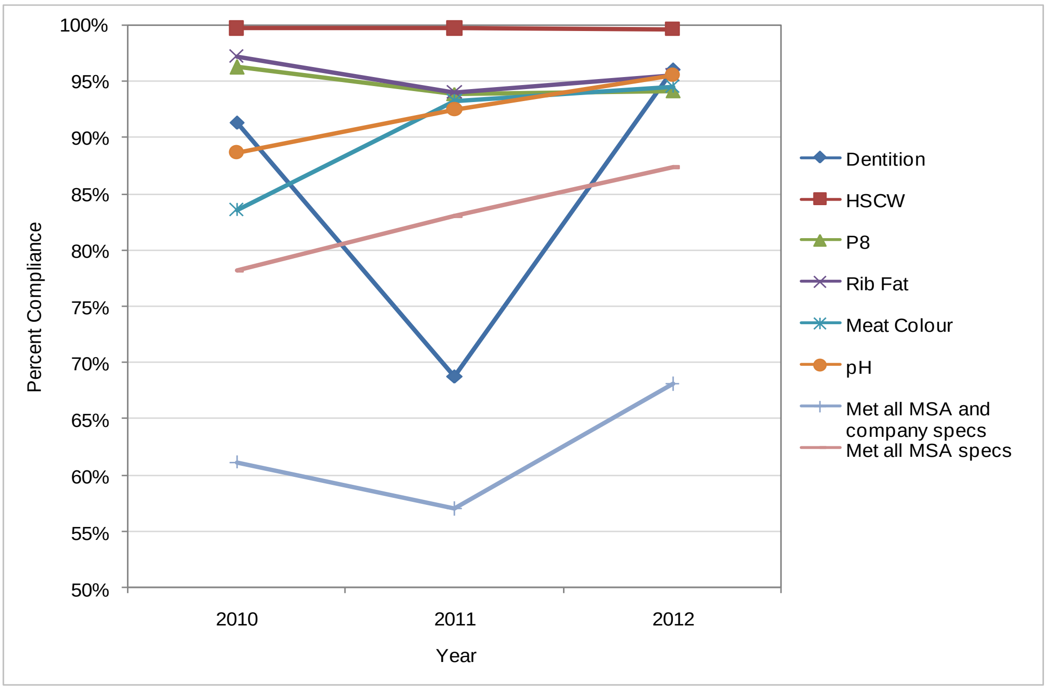


Figure 8. Trait compliance by year

Curfew

Curfew showed a significant relationship with HSCW, meat colour and pH. Compliance for meat colour and pH was higher for animals mustered and trucked on the same day than those curfewed overnight on feed and water.

4.3 P8 fat scanning results

Fat depths recorded by the UltrAmac® fat scanner were compared to P8 fat depths measured at the abattoir. Tables 8 and 9 showed that animals whose scanned P8 fat depth also complied with market specifications had very high compliance with carcase P8 fat depth specifications for both the EU and MSA markets. It was less accurate where carcases were scanned as non-compliant. A high percentage of the carcases scanned as non-compliant met P8 fat specifications at the abattoir (67% for EU and 66% for MSA). This could be due to scanning being more difficult at lower fat depths.

Table 8. P8 fat depth performance of EU market animals scanned for fat depth

	Number of head	Compliance with P8 fat depth specifications at abattoir	
		Number	%
Scanned as P8 fat depth compliant with UltrAmac® scanner	601	582	97%
Scanned as non P8 fat depth compliant with UltrAmac® scanner	33	22	67%

Table 9. Carcase P8 fat depth performance of MSA market animals scanned for fat depth

	Number of head	Compliance with P8 fat depth specifications at abattoir	
		Number	%
Scanned as P8 fat depth compliant with UltrAmac® scanner	1,473	1,416	96%
Scanned as non P8 fat depth compliant with UltrAmac® scanner	93	61	66%

The relationship between scanned P8 fat depth and carcase P8 depth was also analysed (Figures 9 and 10). The relationship was linear with r^2 of 0.53 and 0.51 for EU animals and MSA animals respectively. The relatively low r^2 values compared to the high compliance with market specifications would be due to the fat specification being a range e.g. 6-22 mm for EU.

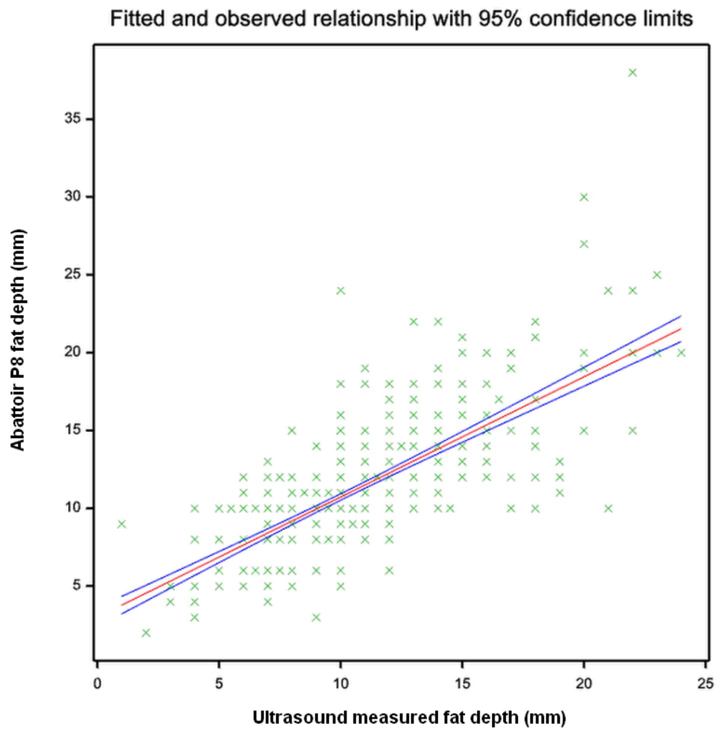


Figure 9. Ultrasound P8 fat depths versus abattoir P8 fat depths for EU carcases

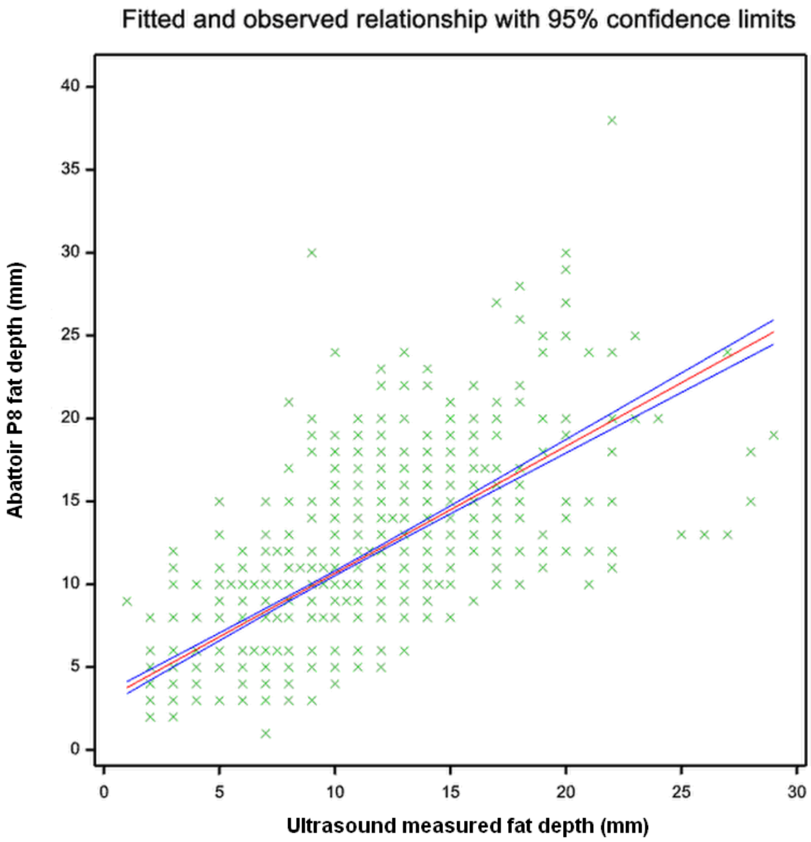


Figure 10. Ultrasound P8 fat depths abattoir P8 fat measurements for MSA carcases

5. Communications

Regular group meetings were held throughout the project to keep members informed. In addition to this a variety of training and field days were offered.

A fat scanning practice day was held on 2 August 2010 with members of the Rolleston CQ BEEF group (seven producers attended). Paul Williams, an experienced scanning technician from CSIRO, was there to demonstrate the correct procedure for scanning animals at the P8 rump site.

The initial results of the data collected so far was presented at an open field day in November 2011, which was followed by a group meeting. After discussing the results to date, the group decided to refocus their data collection on the use of the fat scanner for the remainder of the project.

The group participated in a Confident Livestock Marketing Workshop in Rolleston presented by Angus Brown from Ag Concepts Unlimited on 19 June 2012.

6. Discussion/conclusion

Non-compliance to beef market specifications represents a major cost to the Australian beef industry. This PDS gave the producers a chance to analyse their market compliance rate over three years and identify the main reasons for carcases failing to meet market specifications. The producer group also tested a portable ultra-scan fat depth tester UltrAmac® as a method of ensuring P8 fat depth was in the compliance range.

6.1 Compliance to the EU market

The producers involved in this PDS believed that a significant proportion of their cattle were non-compliant with their target market specifications and anecdotal evidence tends to agree (Slack-Smith et al. 2009).

Data retrieval and analysis was problematic for these carcases. Abattoir reporting is not standardised causing problems with interpretation. Other reasons cited for incomplete data were producers not forwarding on all carcase data to the project coordinator and processors not supplying all the carcase data.

Where carcase trait data was complete, the overall compliance rate for the EU market for the three years 2010-2012 was 87 percent These two properties supplying carcases to the EU market had stable compliance rates of between 86 percent and 87 percent over the three years. MLA (2004) lists the acceptable compliance rate as 90 percent for the EU market in Australia. The top three reasons for non-compliance were dentition, P8 fat depth and meat colour.

When all data was looked at for the 1169 carcases there were not complete records for all six traits, however there was enough information to look at each trait individually for compliance assessment.

The majority of the EU data each year came from Property A. Property B only submitted data on one mob in 2011 and although 100 percent of the carcases from that mob met the P8 fat specifications, 27.5 percent failed to meet dentition and 26.3 percent failed to meet HSCW specifications. Property A only submitted data for one EU mob in 2011 and also had a lower rate of compliance for dentition in that year (27.4% failed) compared to 2010 (6% failed) and 2012 (3.6% failed). Hot standard carcase weight showed a similar trend to dentition, decreasing in 2011 compared to other years. All of the carcases that failed on HSCW specifications were from Property B. It is not known if the producer was aware of the dentition or weight of these animal prior to consignment, or sent them knowing they may not comply.

Individual property management decisions determine the timing for sending cattle to the works. Both of the EU mobs submitted for data analysis in 2011 were sent at the end of the year (6 December for Property A and 16 November for Property B). Therefore, the drop in dentition compliance in 2011 could be explained by the season - a feed shortage or lack of dietary protein over the winter months may have led to lower live weight gain meaning those animals took longer to reach the required weight. Rainfall records for Rolleston show that 94.2 mm fell from July to October in 2011, compared to 380 mm for the same period in 2010.

Fat colour and bruising compliance rates remain consistently high for all three years. In this study, meat colour improved in compliance rate from 92.7 percent in 2010 to 96.2 percent in 2011 and 97.4 percent in 2012. This indicates good presale management in accordance with the guidelines set out by MLA (2004). From the survey completed by each property when sending cattle to the works we know that low stress stock handling was conducted during mustering and in the yards prior to transport.

All cattle were grass fed on improved pastures and managed in a conventional grazing system with wet season spelling (Property A) or a rotational grazing system (Property B).

The EU cattle had all been trucked at least once before their final journey and if the cattle were selected from more than one mob, the different mobs were not mixed in the yards or on the truck in order to minimise stress.

As expected, trucking distance had an effect on meat colour compliance with animals transported 300 km having a higher compliance rate than those transported 900 km. A combination of time spent on the truck (a stressful environment) and the time off food and water during travel leads to glycogen depletion in the muscle, which is a well-recognised cause of dark cutting meat (Deland and McGilchrist, 2012). This effect is also evident when looking at the relationship between curfew and meat colour; those animals that had access to feed and water overnight before travel had a higher meat colour compliance rate than animals that had access to water but no food overnight.

P8 compliance for the EU market showed a slightly downward trend from 2010 (97.4%) to 2012 (93.4%). Of the 47 carcases that failed on P8 fat depth at the abattoir, 41 were scanned using the UltrAmac® and 11 of these had scanned P8 fat depth outside the specifications (6-22 mm). Another five were at the low end of the fat depths. Most of the 47 carcases were well within the HSCW specifications so it is possible that some under-fat animals were sent to fill up space on the truck.

Another possibility is that some under-fat animals were judged to be late maturing from previous scan results and weights so the decision was made to send them to the works rather than retain them and risk a future discount due to dentition (see case study in appendix 3).

6.2 Compliance to the MSA market

Three properties contributed MSA data to this PDS – Properties A, C and D. Sixty percent (60%) of the 4,109 carcases consigned complied with both MSA and company specifications and received a premium price. A further 22 percent would meet MSA specification but did not comply with company specifications for dentition and HSCW. The high overall MSA compliance (Grade codes 0 or 6) was 82 percent indicating considerable potential to increase returns by improving compliance with company specifications.

The main reasons for 18 percent of carcases failing to meet MSA specifications in this study were meat colour and pH (8.7% and 8.2% of carcases respectively).

Meat colour is the largest cause of MSA non-compliance Australia wide (Deland and McGilchrist, 2012). In this study meat colour compliance increased from 83.5 percent in 2010 to 93.2 percent in 2011 and reached 94.5 percent in 2012. The compliance for pH followed a similar trend, increasing from 88.6 percent in 2010 to 95.5 percent in 2012. An ultimate pH value of 5.7 and above will result in dark cutting meat. Glycogen in the muscle is the critical factor that determines the pH as it is converted to lactic acid when an animal dies. Good nutrition builds glycogen in the muscle and stress causes glycogen to deplete so it is no surprise that a longer trucking distance (900 km versus 300 km) caused a decrease in meat colour compliance both EU and MSA cattle and pH compliance for MSA cattle.

Fat depth compliance decreased from 96.2 percent in 2010 to 93.8 percent in 2011 and rose slightly to 94.1 percent in 2012. A similar trend occurred for the EU carcases although there was no increase in 2012. The same reasons could apply as in the case of EU animals – some under fat animals being sent to fill the truck.
The carcases were distributed in a bell curve across the boning groups. Carcases in boning group one represent the highest eating quality and therefore are the most desirable product (MLA 2007). Abattoirs have different specifications when it comes to the boning groups they will accept and this can change with supply and demand. For example, during this PDS the Teys Biloela plant was initially accepting carcases from boning groups 1-8 but this was changed to boning groups 1-11.

6.3 P8 fat scanning

Fordyce et al (2011) compared the accuracy of the UltrAmac® fat scanner at the P8 rump site with another portable unit (Honda-HS 101V) and a larger desk-top unit (Honda-HS 2100V) on 154 steers and 192 cows. They found that live animal measurements varied greatly with probe pressure and that fat thickness could change markedly within a small distance, so correct detection of the P8 site was crucial.

In this PDS, a regression of ultrasound fat versus abattoir-measured fat showed a linear relationship with 53 percent (r=0.53) and 51 percent (r=0.51) of the variation in abattoir P8 fat depth explained by scan P8 fat depth for EU and MSA data respectively. Fordyce et al (2011) made a similar comparison with carcase measures compared two weeks after scanning and found a linear relationship where r=0.64. The difference between the two studies is that Fordyce et al (2011) had the same experienced technician scanning all the animals in the study on the one day whereas in this PDS there were a number of different people doing the scanning (with varying levels of experience) over a period of two years in different sets of yards and on different breeds of cattle, with the abattoir measurement taken one to two days after the live measurement. This leaves quite a bit of room for error.

Like Fordyce et al (2011) we found that the UltrAmac® was unable to give a reading or returned an obviously incorrect reading when P8 fat depth was less than 4 mm. After two years of regular use, a number of improvements to the design of the fat scanner have been suggested by the producers involved in this PDS. These suggestions (Appendix 4) have been forwarded on to AMAC Digital Products (maker of the UltrAmac®).

6.4 General discussion/conclusions

Overall, the average EU compliance rate achieved during the three years of the PDS (87%) is not far under the MLA (2004) recommended target of 90 percent. Carcase traits that could be improved to increase EU market compliance are dentition, P8 fat depth and meat colour.

The MSA compliance rate of 60 percent could be improved through management changes to monitor and manage dentition and HSCW. An additional 753 carcases would have received the MSA premium if they had met company specifications.

In terms of the management strategies the four properties employed to meet market specifications, the main change they made was to increase their use of the fat scanner. It has proven to be a very useful tool for decision making and attitude towards the fat scanner has changed markedly over the course of the PDS. The producers were sceptical at the beginning of the project and would only scan animals if they looked like they were on the borderline for meeting the P8 fat depth specifications. By the end of the project, one producer in particular would scan almost every animal in every mob and use those objective scan measurements to look more closely at which animals (based on their past performance) were unlikely to achieve the necessary weight gain and fat depth cost effectively if sent back to the paddock, given the current and expected seasonal conditions.

Options for improving compliance (particularly for pH and meat colour specifications) include management and nutrition. From our survey of properties, adequate management procedures have been put into place for reducing stress before slaughter and guidelines for low stress stock handling are followed. These guidelines include appropriate mustering and yard-handling techniques, regular human contact throughout every animal’s life, no mixing of mobs, well maintained yards with no sharp objects and no over-loading of trucks (MLA 2004).

This PDS has shown that compliance can be improved by mustering and trucking on the same day, and if animals are held overnight before trucking ensure they have access to food and water.

The producers in this PDS now know how their herds have performed in terms of market compliance from 2010-2012, and have realised the benefit of using a hand-held fat scanner to make informed decisions based on objective measurements within their businesses. There are options for improving compliance. However, it is up to the individual property owner to decide whether those options will improve their compliance rate enough to offset any change in management and the possible cost of implementing a change in practice.

7. Appendices

7.1 Appendix 1 – Market compliance producer survey

<u>Market Compliance Survey</u>
(To be completed on day of transport)

NVD________________________________

Trucking date: ________________ Time: ______

Property name & address: ____

Owners name(s): ____

(Name) (Trading Name)

Property/place where cattle were trucked from (if different, otherwise 'as above'):

____

Transport Company: ______________________ Accreditation (Y/N): __________

Destination: ____

Distance to destination (km): ______________________

Approx. travel time: _____________________________
(hrs) (min)

How the animals travelled: (e.g. good, bad, terrible – please comment)
____

Numbers per deck loaded: ___________________________________

Will the cattle travel non-stop to the processor (please circle if known)? Yes No

Slaughter date: _____________________________________

Market grid specification (please circle): MSA EU Jap Processors grid

No. head: _________________________ Sex: ___________________

Breed (majority): _________________________ Age (brand yr): ___________

Dentition (majority): ☐ *Milk Tooth* ☐ *2 Tooth* ☐ *4 Tooth* ☐ *6 Tooth* ☐ *8 Tooth*

Comments____

<u>Curfew:</u>

☐ *Mustered and trucked same day*	☐ *Trucked from feedlot*
☐ *Mustered previous day, on water on feed overnight overnight*	☐ *Mustered previous day, off water and off feed*
☐ *Mustered previous day, on water off feed overnight overnight*	☐ *Mustered previous day, off water on feed*

If mustered on the previous day where were they held?

Yards *Holding Paddock* *Other* ___________

If on feed what type of feed where they on overnight?

Pasture *Fortified molasses* *Feedlot ration*

Hay: Forage hay *Cereal grain hay* *Grass hay*

Comments ____

Other ____

What were the weather conditions like during curfew? (e.g., hot and humid, little to no breeze overnight, cold, wet, etc.)

____

When were the cattle processed to collect final exit data? *(Please circle)*

Day before transport Day of transport < 1 week prior

1 – 2 weeks prior 2 – 4 weeks prior 4 – 6 weeks prior

Other ______________________________

Comments:____

Were the dynamics of the mob altered in order to select the mob for slaughter? *(Please circle)*

No change (total number all ran together prior) Drafted out of a number of mobs

Drafted out of one mob

*If drafted out of a number of mobs, how many different mobs?*____________________

*Comments*____

Cattle Handling Techniques

What is the general mustering technique practiced on the property? (e.g. muster by horses or bikes and dogs) ____

What is the distance walked to yards for transport?______________________________

How long did it take to walk them to the yards for transport?______________________

How did this particular mob muster? (e.g. good, explosive, etc.)

Comment: ____

Did you practice LSS today *(please circle)*: Yes No

Has this mob previously been exposed to LSS handling? Yes No

How many animals (total) were mustered in this mob? ____________________________

Cattle History

Have these cattle been trucked prior to today? *(Please circle)*

Yes No Don’t know

Has the current owner owned these cattle since their birth?

Yes No

If no how long ago where the cattle obtained/purchased?

Less than 2 mths 2 – 6 mths 6 - 12mths more than 12mths

Comment____

Have these cattle ever been treated with a HGP?

Yes No

HGP details and regime:

____

What percent of stirry cattle are in the mob?

N/A (all quiet) 1-5% 5-10% more than 10%

Comment ____

Feed History (Fattening period – prime animals)

What were these cattle finished on? *(Circle all relevant)*

Improved Pasture Leucaena Forage Crop Grain Assist

Feedlot Others ____

If cattle were grass fed:

What grazing technique were these cattle finished on?

Conventional Grazing *Rotational Grazing* *Cell Grazing*

*Comment*____

How long were they in their final paddock prior to trucking?_______________________

*Comment*____

What was the growth stage/condition of the pasture at time of slaughter? *(Please circle)*

Dry Fresh Pick Vegetative Flowering Seeding

Hayed off Comment____

Was there a supplement available? (Not including grain assist)

Yes No

If yes, what type of supplement was available?

Water medication Fortified molasses lick Urea lick Others____________

*Comment*____

When was the supplement made available to them (please comment if available all the time)? ____

Environmental Conditions

What have the weather conditions been like for the past week/month? (e.g. sunny, overcast, raining, etc.)____

What temperature patterns have been experienced leading up to trucking? (e.g. cold nights, hot days, max, min, etc.)

____

What were the weather conditions on day of trucking? (e.g. windy, hot, cold, overcast, etc.)______________________________

What was the temperature on day of trucking?______________________________

Comments: ____

Was there any further known stress placed on the mob? (e.g. ticks, flies, sandflies)_____

____

Fat Scanner

Do you believe that the equipment slows down the processing time? ________________

Do you believe that it is worth the time taken? ______________________________

Have you found it easy to use?______________________________________

Comments____

____

General Comments

____

____

____

____

____

____

____

____

____

7.2 Appendix 2 – Yard procedures handbook

What to do if you want to be involved in the PDS

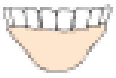
- When you know you have cattle ready to send to the abattoir, record as much data on them as possible, e.g. weights, fat scans, faecal NIRS, dentition, temperament scores, body condition scores, HGP vs. no HGP, etc.
- On the day of trucking, fill out the Market Compliance Survey (contact Peggy if you don't have a copy of this survey)
- Send through as much data as you have to Peggy, i.e. yard data, NIRS results, kill sheets, MSA results, etc. (the more information the better!)
- If you have any queries, please do not hesitate to contact Peggy Rohan

  Ph: (07) 4983 7413   Fax: (07) 4983 7459

  Email: peggy.rohan@deedi.qld.gov.au

Remember, this is a ***Producer*** Demonstration Site – it is up to you to supply the data that will lead to results!

Dentition

0 	**Yearling Steer *YS***	Carcase is derived from **castrate or entire male** bovine that: • Has 0 permanent incisor teeth • Has no evidence of Secondary Sexual Characteristics (SSC)	**Yearling** *Up to 18 months
	Yearling Beef *Y*	Carcase is derived from **female, castrate or entire male** bovine that: • Has 0 permanent incisor teeth • Has no evidence of SSC	
0 – 2 	**Young Steer *YGS***	Carcase is derived from **castrate or entire male** bovine that: • Has no more than 2 permanent incisor teeth • Has no evidence of SSC	**Young** *Up to 30 months
	Young Beef *YG*	Carcase is derived from **female, castrate or entire male** bovine that: • Has no more than 2 permanent incisor teeth • Has no evidence of SSC	
0 – 4 	**Young Prime Steer *YPS***	Carcase is derived from **castrate or entire male** bovine that: • Has no more than 4 permanent incisor teeth • Has no evidence of SSC	**Moderate** *Up to 36 months
	Young Prime Beef *YP*	Carcase is derived from **female, castrate or entire male** bovine that: • Has no more than 4 permanent incisor teeth • Has no evidence of SSC	
0 – 7 	**Prime Steer *PRS***	Carcase is derived from **castrate or entire male** bovine that: • Has no more than 7 permanent incisor teeth • Has no evidence of SSC	**Mature or Steer or Ox** *Up to 42 months
	Prime Beef *PR*	Carcase is derived from **female, castrate or entire male** bovine that: • Has no more than 7 permanent incisor teeth • Has no evidence of SSC	
	Ox *S*	Carcase is derived from **female** (only) bovine that: • Has no more than 7 permanent incisor teeth	
0 – 8 	**Ox or Steer *S* or *SS***	Carcase is derived from **castrate or entire male** bovine that: • Has up to 8 permanent incisor teeth • Has no evidence of SSC	**Ox, Steer or Cow** *Any age
	Cow *C*	Carcase is derived from **female** bovine that: • Has 8 permanent incisor teeth	
Only carcases with 0 – 7 permanent incisor teeth represents product labelled for the export market and diverted to the domestic trade. Carcases with 8 permanent incisor teeth mush be described using either the term Budget Grade or Manufacturing as applicable. *Chronological age as shown is approximate only			

Fat Scanning Protocol

Please refer to the Fat Scanning Manual (stored in the case with the scanner).

The P8 Site

Handy tips:

- Scanner works best when fully charged, i.e. put it on charge overnight before using it
- You need to use more oil than with other types of scanners to obtain a good reading
- Look at the animal - if the reading doesn't seem accurate it probably isn't; if there is very little fat coverage (under approximately 4mm), the scanner either doesn't show a measurement or it will show high numbers (around 23 -30mm), which means it is picking up the muscle layer below, rather than the fat depth
- Rib fat depths will only be accurate on animals with good coverage - you have to make sure the probe sits flat on the animal and because of the shape of the probe, you can't get it to sit flat between the ribs if there is not enough fat coverage

Faecal NIRS Sampling Protocol

(*Symbio Alliance sample sheet)*

The quality of the diet consumed by cattle is one of the main determinants of productivity (i.e. reproductive performance, growth rate and carcass quality), however traditional methods of estimating the diet quality of grazing cattle can be costly, time consuming and generally unreliable. Faecal Near Infrared Reflectance Spectroscopy (Faecal NIRS) is a relatively new technology that is quick, inexpensive and reliably predicts the diet quality of grazing cattle, allowing producers to obtain critical information for on-property decision making, leading to more efficient production systems and enhanced economic viability, especially in relation to strategic and cost-effective supplementation.

How to Submit a Sample for Faecal NIRS

Any test result is only as good as the sample submitted, so it is worth taking a little time to ensure that the sample you submit (and pay for) is truly representative of your production system and arrives at the laboratory in a condition suitable for testing. Wet samples are not suitable for testing.

Bulk sampling from a mob

1. Fresh dung is needed (generally available at watering points or cattle camps)
2. Samples from 10 – 15 different animals should be bulked to make a composite sample.

- Take a small amount (e.g. volume equivalent to half a tennis ball) from selected dung pats and mix well in a plastic container
- After mixing, sub-sample to obtain approximately 200 grams of faeces (full tennis ball size) and place in plastic bag (supplied) for storage and/or drying
- Ensure that bag is clearly labelled to identify where and when the sample was taken
- If sample is to be dried at a later date, it should be frozen as soon as possible after collection
- If sample is destined for immediate drying, ensure it is kept cool until drying is performed

Oven drying:
Samples can be oven dried at 60 – 65 degrees Celsius. The sample should be broken up during drying to hasten the process.

Sun Drying:
1. The faecal sample to be dried should be placed on a piece of clean, flat galvanized iron sheet or other non-absorbent sheet in a sunny position
2. The sample should be spread out like a pancake to a thickness of about 10 mm or less
3. After about 4 hours in the sun, the sample should be turned over using an old egg slice
4. Try to keep the sample in one piece
5. After another 4 hours the sample should be dry enough to break up and place in the sample jar provided
3. If conditions are windy, cover samples with chicken wire to prevent loss of material

The dried samples should be broken up once cooled and placed in the plastic jar provided. Note the sample identification and your name on the jar.

Docility Scores

Score	Code	Description
1	Docile	Mild disposition, gentle and easily handled, stands and moves slowly during handling, undisturbed, settled somewhat dull, does not pull on headgate when in crush, exits crush calmly
2	Restless	Quieter than average but slightly restless, may be stubborn during handling, may try to back out of the crush, pull back on headgate, some flicking of tail, exits crush promptly
3	Nervous	Manageable but nervous and impatient, a moderate amount of struggling, movement and tail flicking, repeated pushing and pulling on headgate, exit crush briskly
4	Flighty	Jumpy and out of control, quivers and struggles violently, may bellow and froth at mouth, continuous tail flicking, defecates and urinates during handling, frantically runs fence line and may jump when penned individually, exhibits long flight distance and exits crush wildly
5	Aggressive	May be similar to score 4 but with added aggressive behaviour, fearful, extreme agitation, continuous movement which may include jumping and bellowing while in crush, exits crush frantically and may exhibit attack behaviour when handled alone

Source: Breedplan Tips, Recording Docility Scores, BREEDPLAN International Beef Recording Scheme

Body Condition Score (BCS)

BCS – 1
Very poor

BCS 1.5
Poor

BCS – 5
Very fat

Fat

7.3 Appendix 3 – Case study: P8 fat depth – the cost of non-compliance

7.3.1 Background

A group of beef cattle producers in the Rolleston district were interested in improving the market compliance of their cattle. The group decided to launch a producer demonstration site (PDS) to look into what their compliance rates were for different markets, what was causing animals to fail the market specifications and what could they do to improve compliance.

A producer using the UltrAmac® fat depth scanner on EU steers.

The graziers were particularly interested in P8 fat depth so as part of the project the graziers purchased a hand held UltrAmac® fat depth scanner to record live measurements at the P8 rump site on their animals to help determine when they were ready to send to the abattoir.

7.3.2 Fat depth scanner

The UltrAmac® fat scanner has come to be a very useful tool for the graziers involved in the PDS. Their attitude at first was sceptical however; it has now become part of their usual management practice when processing cattle before sale. Ian McCamley from 'Lowesby' was one of the instigators of the PDS.
"The fat scanner allows us to know what we're selling on the day. It helps us to choose between the keepers and the culls. We can make a conscious decision to sell under-fat animals if we believe they won't finish in time," he said at the end of the PDS project.

7.3.3 The cost of non-compliance

Using objective measurements from the scanner, an economic analysis can be done to work out whether it is better to send an animal that has been judged by the scanner to be under-fat (not likely to meet the minimum abattoir specification for P8 fat depth) or to send it back to the paddock for more time to finish. Here is an example of a scenario:

No. of head	100
Failure rate (%)	0.05
Compliance price	3.40
Non-compliance price	3.25
Agistment cost $/hd/wk.	0
Time on agistment (wks.)	0
Av. sale liveweight (kg)	550
Carcase dressing %	0.52
Av. carcase weight (kg)	286
Total value of mob	**$97,025.50**

If we work on a base herd of 100 head and say five percent of those fail to reach the minimum P8 fat depth of 6 mm in the yards but we send them to the works anyway; 95 animals will be paid the compliance price and five will be discounted by $0.15. Assuming the average sale weight is 550 kg and a 52% dressing percentage the total value of the mob is $97,025.50.

The other option would be to hold onto those five animals that are under-fat and send them back to the paddock to finish as in Scenario 1 below.

	Scenario 1 Part A	Scenario 1 Part B
No. of head	95	5
Failure rate (No. of head)	0	1
Compliance price	3.4	3.4
Non-compliance price	3.25	3.25
Agistment cost $/hd/wk	0	5
Time on agistment (wks)	0	20
Av. sale liveweight (kg)	550	620
Carcase dressing %	0.52	0.52
Av. carcase weight (kg)	286	322
Sub total value	$92,378.00	$4,925.70
Total value of mob	**$97,303.70**	

In scenario 1 A, the 95 animals in the base herd that achieved the minimum fat depth in the yards (according to the scanner) were sent to the works and paid the compliance price. The five animals that were under-fat were sent back to the paddock. They spent 20 weeks on grass pastures and assuming they averaged a weight gain of 0.5 kg /head /day, they reached an average sale weight of 620 kg. The agistment cost takes into consideration the value of the pasture as well as the extra time and labour cost of holding onto that mob for longer. Part B also assumes that there is one animal that is still under-fat and therefore receives the non-compliance price. Despite the additional costs involved, the total value of the mob comes out at $97,303.70 ($278.20 more than, if all 100 head had gone to the abattoir at once).

There are a number of assumptions in this scenario that need to be carefully considered. For example: Is the price going to stay the same for the 20 weeks it takes to finish the under-fat animals? Will they average 0.5 kg/hd/day under the current seasonal conditions and is there enough pasture in the paddock? Will they put on too much weight or cut more teeth and receive a price discount despite reaching the minimum P8 fat depth? Each of these factors will impact on the price received for the mob.

The BeefSpecs calculator is another handy tool to use in conjunction with the fat scanner. For scenario 1, the calculator was used to work out the days on feed (time on agistment) required to increase the fat depth to meet the minimum of 6 mm. A cross bred steer (25% each of British and European descent, 50% *Bos indicus*) with a frame score of 6 on grass pasture (no HGP) at a growth rate of 0.5 kg/day is expected to grow from 550 kg and 3 mm of fat to 606 kg with a final P8 of 6.3 mm after 140 days on feed.

If more animals in the base herd had failed to meet the minimum P8 depth, the margin could be a lot higher between the base value of the mob and scenario 1. The real value for graziers is in knowing their options thanks to objective fat scan measurements.

7.4 Appendix 4 – Operator hand book for UltrAmac® (suggestions for improvement)

OPERATOR HANDBOOK

FOR THE

FAT DEPTH METER

FOR BEEF CATTLE

B-10

The blue bubbles throughout this document contain:

- **Tips for future users**
- **Suggestions for improvement to the scanner (ideas from producers)**
- **Queries from producers**

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Operator Handbook for the ULTRAMAC

FOREWORD

The specifications, illustrations and information contained in this manual were in effect a the time the manual was approved for printing; however, Advanced Measurement And Control Pty Ltd reserves the right, subject to the laws of Australia or any applicable State or Territory thereof which may apply at the time, at its discretion and without notice to change the specifications and prices of the **ULTRAMAC**, options, parts and accessories referred to herein at any time and without incurring any liability whatsoever to any purchaser thereof in respect of any such change.

Your thorough understanding of the contents of this manual will assist you in obtaining the maximum benefits from your **ULTRAMAC**.

FAT DEPTH METER ULTRAMAC

The **ULTRAMAC** measures the fat depth on live beef cattle.

The **ULTRAMAC** uses high frequency sound waves to probe the hide, fat, and muscle layers. It uses the echoes from these sound waves to measure the fat depth between hide and muscle. A digital display instantly shows the results of this measurement to the nearest millimetre.

Although the handling of the instrument does not require special skills, a description and explanation of the features and workings as outlined in the following pages will assist in the most efficient operation of the instrument.

PARTS OF THE INSTRUMENT

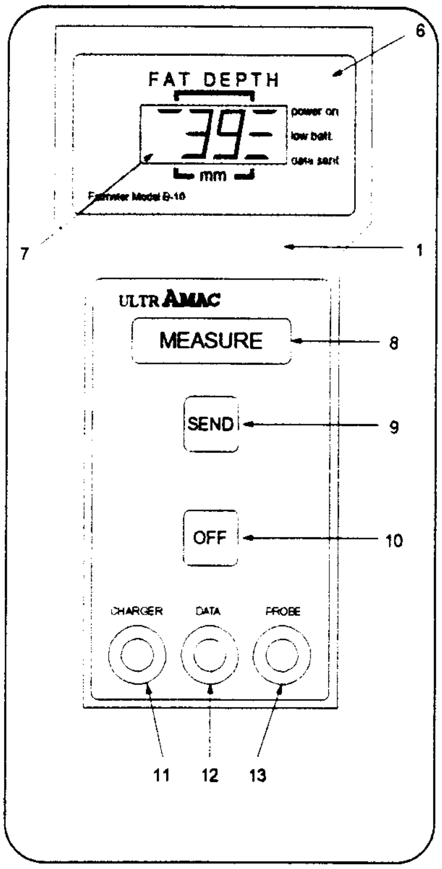
Supplied as parts of the total instrument set are:

- **ULTRAMAC** Model **B-10,** with protective pouch (1)
  Size: 21cm x 10cm x 5cm
  Weight: 0.8kg including batteries
- Transducer **AMAC** P/N 207-010 (2)
- Cable between the transducer and the main unit (3)
- Mains battery charger (4)
- Test block (5)

(See Photo and Diagram for reference.)

Optional extras available:

- Carry Case
- Cable between Fat Depth Meter and external 12V battery
- Cable between Fat Depth Meter and car cigarette lighter
- Data Logger
- Printer
- Cable to Data Logger, Printer and Computer



Following is a brief description of the most important parts of the ULTRAMAC:

The entire electronic circuitry and the batteries are contained in an ABS housing, the ‘main unit’ (1). The main unit is enclosed in a protective cover. It is recommended that the main unit remains in this protective cover.

The transducer will be connected with the main unit via the cable (3) at the port marked “PROBE” (13).

In the display area (6) within the window (7) the fat depth and other signals will be shown. The actual fat depth will be displayed above the text “mm”. To the right of the number displayed, bars will show you when the power is on, the batter is low, or the data displayed has been sent, each as indicated by the text written in the window outside the display area. To the left of the number displayed, a bar will show you when the ‘MEASURE’ button (8) is pressed. On activating the ‘SEND’ button (9), the displayed data is transmitted to an external device through the ‘DATA’ port (12). The instrument will switch itself off after 6 minutes in standby mode, but you can switch it off by pressing the ‘OFF’ button (10) at any time. The mains charger or any 12V power supply as described later will be plugged into the port marked “CHARGER” (11).

AVOID HITTING THE TRANSDUCER AGAINST HARD SURFACES. The transducer face contains a very sensitive element which can be damaged if it suffers a direct impact from a hard object. Due care should be taken to avoid dropping the transducer or hitting it against railings or other hard surfaces.

RECHARGING THE INTERNAL BATTERIES AND ALTERNATIVE ENERGY SOURCES

The internal batteries will not be charged when the instrument is first delivered to you.

To recharge the batteries, connect the main unit with the charger provided to a mains supply using the “CHARGE” port on the main unit. To fully charge empty batteries from the mains supply will take 14 hours.

Fully charged batteries will give you 500 measurements at 10 seconds each with an extra 8 hours of standby time (see chapter on “OPERATION” for explanation of ‘measurement’ and ‘standby’).

As an indicator for low batteries, one bar in the right of the display window will appear next to the text ‘low batt”. This is a warning signal and will first appear when you press the ‘MEASURE’ button. You will still have time to so some short measurements, but the display will soon start to blank out completely when you try to do a measurement. Finally, the display will go completely blank. At this point, fully recharge the batteries to maintain the full battery capacity.

As a backup, the instrument can be operated from an external 12V battery such as a car battery by using the port marked “CHARGE” on the instrument as you use for 240V supplies. If you are running the instrument directly from a car battery, check carefully that you are using a 12V negative earth system to prevent accidental short circuiting. Cables for running the instrument either from battery terminals or a cigarette lighter can be supplied by **AMAC** on request. On the cable you will find clearly marked, which side has to be connected to the positive and to the negative terminal. Fuses are built into the cables to protect the instrument from accidental short circuiting.

The instrument can also be operated by permanent connection to mains power through the charging unit supplied.

If you have any special recharging requirements, please contact **AMAC**. In most cases we will be able to provide you with cables or connectors you need for your application as well as recommendations how to solve special problems.

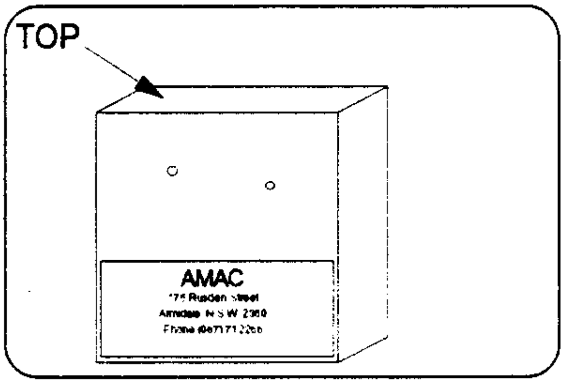
Tip for future users: the scanner works best when fully charged – best to charge overnight before you use it. Readings can become less accurate as battery dies

TRIAL OPERATION WITH TEST BLOCK

Note:
Ultrasound gets absorbed very quickly in air; a coupling medium is required between the face of the transducer and the surface you want to measure from at all times. Vegetable oil is recommended as it is inexpensive and provides excellent coupling.

1) Connect the transducer cable to socket marked ‘PROBE’.

2) Apply oil to top face (see diagram) of test block.



3) Place transducer down on top face of test block.

4) Press ‘MEASURE’ button.

When you press the ‘MEASURE’ button, the **ULTRAMAC** will actively take measurements. A bar appearing in the top left corner of the display area will show you that the instrument is in measuring mode.

Slowly moving the transducer from side to side will cause various numbers to appear in the display area. If you release the measuring button while a number is displayed, the bar in the top left corner of the display area will disappear and the number will be held on display. The instrument now is in standby mode. It will switch itself off after about 6 minutes.

While the instrument is in standby mode and the display shows a number, the result of your measurement can be sent to an external recoding device (if connected) via the ‘DATA’ port by pressing the ‘SEND’ button. When the data has been sent, a bar next to the text ‘data sent’ will appear in the display area. To avoid accidental sending of the same measurement more than once, this value cannot be sent again. For further information about data connections see Appendix ‘SERIAL INTERFCE’.

On closer examination of the test block and the display, a correlation will be found between the position of the transducer relative to two fine holes in the test block and the numbers displayed. When the centre of the transducer is directly above one of the holes, one number will be displayed, when the transducer is above the other hole, the other number will appear. This display area will remain blank when the transducer is between holes or at the edge of the block.

Note:
The **ULTRAMAC** will only display a number if it has good reason to believe that the value it displays is an actual fat depth. To achieve that the **ULTRAMAC** sends out an ultrasound signal which partly penetrates the hide, fat and muscle, and partly gets reflected from interfaces between those layers. From the reflected part of the signal, the instrument first determines the position of the hide/fat interface relative to the transducer, and then the position of the fat/muscle interface. The distance between the top of the test block and a hole represents the hide, and the distance between a hole and the bottom of the test block represents the fat layer. From the relative positions of these interfaces, the instrument then determines the thickness of the fat. When the instrument does not find a suitable first hide/fat interface, it does not accept the reading as valid and does not display any number.

If the transducer is taken away from the surface, a number may appear on the display, especially if the coupling fluid remains on its face. The value displayed in this case depends on the actual transducer being used and has no significance. It is caused by multiple reflections of the sound at the surface of the transducer and disappears when the transducer is in proper contact with another surface.

Please do not force any connectors onto the **ULTRAMAC**. If force is required, an incorrect cable may be being used, or the connectors may have become damaged or dirty.

If a longer or shorter cable is required, please contact the manufacturers and cable to suit your application will be supplied.

Tip for future users: We found that the scanner was more accurate at picking up fat depths of 4mm and above. Sometimes if the fat depth was less than 4mm the scanner would read the depth to a lower muscle layer and display a much higher number; it is important to look at the animal itself and judge whether the reading is true.

Tip for future users: We found that when scanning an animal (at the P8 site) prior to slaughter, an animal scanned on the day of transport was more likely to comply with meat colour specifications than an animal scanned the day before and kept in yards overnight.

MEASURING FAT THICKNESS ON THE ANIMAL

The instrument will measure the thickness of the fat layer between the hide and the first layer of muscle or bone anywhere on beef cattle. There are, however, two standard sites at which fat depth measurements are conventionally taken.

SITES[1]:

The P8 site is located on the rump of the animal at the intersection of two lines. One line extends down the side of the animal from the 'HIGHBONE' (sacral vertebra) and the other line extends *parallel* to the backbone along the side of the animal starting from the pin bone. The fat depth from the P8 site should be taken within an area around the intersection of these lines.

Tip for future users: we found rib fat was difficult to read using this scanner due to the shape of the probe – the round disc doesn't fit very well between the ribs unless the animals have very good coverage (i.e. higher fat depth).

The 12/13 rib site is located by feeling for the gap between the last and second last rib. Follow the gap up to the backbone. The site is on the side of the animal, ¾ of the distance across the eye muscle from the backbone.

OBTAINING A MEASUREMENT

Producer idea: Could the probe itself be hooked up to an oil supply so that a button could be pressed to release oil through the probe onto the P8 site? This would eliminate the need for a separate slippery sauce bottle or other method.

OIL

A fluid has to be applied to the measurement area as an acoustic coupling agent. Vegetable oil has proven to be a very successful and inexpensive material. The purpose of the fluid is to exclude air between the transducer face and the hide. So, depending on how much hair grows in the area you want to measure and the amount of dirt trapped in the hair, more or less oil may be needed. If the animal is extremely dirty, it might be necessary to brush the area where you want to measure. To make sure most air is expelled, some rubbing in of the oil is probably needed. Moving the transducer around *slowly* within the area to be measured while maintaining contact between the transducer and the animal will also help to create good contact between hide and transducer. Some practice will help you to judge the correct amount of oil for different situations. If you have difficulties obtaining good readings, more oil will resolve your problems in most cases.

Tip for future users: this scanner uses more oil than the more expensive and or sensitive ultrasound scanners (e.g. those used for ovarian scanning).

TRANSDUCER CONNECTION

Connect the transducer cable to socket marked 'PROBE'.

TRANSDUCER ORIENTATION

The transducer should be placed as nearly as possible perpendicular to the hide. The transducer emits an ultrasound signal and receives the echoes created by interfaces between layers of different densities like fat and muscle. If the transducer is placed onto the hide at an angle the beam will not be reflected back correctly and it will generally miss the transducer altogether.

TRANSDUCER PRESSURE

Don't press the transducer down too hard onto the hide. Good contact is needed, but the fat layer should not be squashed and distorted. Light pressure is all that is required, although firm pressure can be used while searching for a good measurement location.

Producer idea: Maybe come up with an analogy for the required pressure?

Tip for future users:
If the idea above isn't plausible, we found that a wintix gun (or any other drench/backline gun) worked well for supplying the required amount of oil. The gun could be hooked up on a spring above the crush/race and just pulled down to squirt oil when needed.

MEASUREMENT
Press the 'MEASURE' button.
When you press the 'Measure' button, the **ULTRAMAC** will actively take measurements. A bar appearing in the top left corner of the display area will show you that the instrument is in measuring mode.

Note:
It is best to apply the transducer to the measurement area before pressing MEASURE button.

DISPLAY
The electronics make quite complicated decisions before a result is displayed as a valid number. However, the display should be instantaneous. If you do not obtain a display, first make sure the 'MEASURE' button is being pressed. If there is still no number, move the transducer *slowly* within the measurement area while maintaining contact.

Tip for future users: in terms of accuracy, we compared the ULTRAMAC scan values to the abattoir measurements and found that there was a good correlation between the two. The scanner readings did tend towards being slightly more conservative (1-2mm lower) than the abattoir measurements at the P8 site.

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TROUBLE-SHOOTING

NO DISPLAY

First Check:

- Battery charged?

To check weather a discharged battery is at fault, connect the instrument with the charger provided to mains power and try again.

Second Check:

- Bar next to ‘power on’ displayed after “MEASURE’ button pressed?

Press the ‘MEASURE’ button. The bar in the top left hand corner should appear. It might take a little practice to find the correct pressure required to activate this button, but force is not necessary! The bar in the top left hand corner will disappear after you release the ‘MEASURE’ button, but the bar in the top right had corner will stay as long as the instrument is in standby mode. The easiest way to operate the instrument is to hold it in one hand and press the ‘MEASURE’ button with you thumb of the same hand. You will soon find out whether it is easier for you to hold the instrument in your right hand or your left hand. Both bars will appear whether a transducer is connected or not.

If there is still no display, contact the manufacturers or suppliers.

INTERMITTENT DISPLAY OF NUMBER

Check:

1) Transducer connected correctly to main unit?
2) Any obvious damage to either transducer or connectors?
3) Verify on the test block that the instrument is working correctly!

If the answer is yes to all three checks and still no display of numbers, contact the manufacturers or suppliers.

NO READING ON THE TEST BLOCK

Check that the holes in the test block are not filled up with oil or other material.

NO STABLE READING ON THE ANIMAL

Tips for future users: We found this could happen also if the animal didn't have enough fat (under 4mm).

- Try first to apply more coupling oil, rub it in and try again.
- Don't hold the transducer rigidly, move it around slowly in the area you want to measure and alter the angle slightly.
- Make sure you are not trying to measure through a brand. It is almost impossible to create good contact over an area large enough to get a good signal through a brand.
- Make sure you are not trying to measure through paint.
- Try the other side of the animal.
- Keep an eye on the bar in the top left hand corner; it will disappear when the 'MEASURE' button is not pressed.
- Verify on the test block that the instrument is working properly.

SPECIAL PROCEDURES FOR 'DIFFICULT' ANIMALS

- By far the main reason for an instable reading is insufficient contact between the transducer and the animal. More oil will eliminate the problem in most cases.
- On rare occasions the skin can be very rough and uneven and more pressure might be required to achieve the contact. Care has to be taken that any compression of the fat is taken into account when determining the fat depth of this animal.

GENERAL COMMENTS

- Do not force connectors. All connectors fit easily and smoothly.
- BE CAREFUL. The face of the transducer is fragile. Transducers and cables are not included in any warranty; they can be bought as spare parts or replacements from the manufacturers.
- Assist in the maintenance of the **ULTRAMAC** by keeping it clean. Wipe off any oil and dirt before storage.
- If you have any questions that need clarification, please to not hesitate to contact the manufacturers at the following address:

Advanced Measurement and Control Pty Ltd
ACN 054 088 836
209 Beardy Street
Armidale NSW 2350
Phone: 067 712266
Fax: 067 712268
Email: amacpl@ozemail.com.au

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WARRANTY

The instrument is warranted for 6 months from date of purchase against failure due to any defect in materials or workmanship, provided the instrument has been treated, in the opinion of the manufacturer, with reasonable care.

Any instrument must be returned to the manufacturer for repair. Freight charges will be the responsibility of the owner.

If, in case of a warranty claim, the instrument cannot be repaired within one working day, **AMAC** will provide a replacement at its own expense free of charge until the repaired unit can be returned to its owner.

Query from producers: Does the unit ever need to be re-calibrated?

SERVICING

The instrument is designed to provide years of trouble-free operation. If a fault should occur it is recommended that the unit be returned to **AMAC** for repair as our technicians are able to provide the most comprehensive servicing of this product.

APPENDIX

SERIAL INTERFACE

A DATA output socket is provided on the **ULTRAMAC** B-10 so that the fat depth values may be recorded by a data logger, sent to a computer or printed out.

The FAT DEPTH appearing on the display is output when the SEND key is pressed. The DATA SENT Indicator comes on the **ULTRAMAC** B-10 display showing that the value has been output. The DATA SENT indicator is then cleared when the next measurement is made. If no reading is on the display, pressing SEND has no effect.

DATA LOGGER

To record the FAT DEPTH values with a data logger, connect the DATA output on the **ULTRAMAC** B-10 to the serial port on the data logger. Refer to your data logger manual for instructions on how to setup the data logger.

COMPUTER

To record the FAT DEPTH values with a computer, connect the DATA output on the **ULTRAMAC** B-10 to the serial port on the computer. Serial ports are often labelled COM1, COM2 etc. Refer to your computer manual for instructions on how to set up your computer. Software is available for IBM compatible computers to setup your computer and record the FAT DEPTH values. Contact **AMAC** or your supplier.

PRINTER

The FAT DEPTH may be printed out directly by connecting the DATA output to the **ULTRAMAC** B-10 to the serial input on a printer. Refer to your printer manual for instructions on how to setup your printer.

CABLES

Producer idea: Would it be possible to have the probe connected to the unit via Bluetooth so the cable is not necessary?

Accessory cables are available for various computers, data loggers and printers. Contact **AMAC** or your supplier for accessory cables to suit your special application.

If Bluetooth isn't possible, could the probe itself have a measure button and small screen to display the fat depth measurement so that the unit could hang nearby and the user need only hold onto the probe?

SPECIFICATION SERIAL INTERFACE

Type	Serial
Baud Rate	300 baud, internally present
Format	8 bits 1 stop bit No parity
Data	ASCII fat depth in mm: <tens digit> <units digit> <linefeed> A leading zero is output for values up to 9mm.
Connector	
pin 3	data
pin 2	not used
pin 1	ground

APPENDIX
SERIAL INTERFACE
2

Producer idea: Is it possible, given technology advancements, to make the unit any smaller? Or to change the shape to make it fit more comfortably in the palm of a (smaller) person's hand?

SPECIFICATIONS

ULTRAMAC
FAT DEPTH METER
Model B-10

Ultrasound Fat Depth Grading for Beef Cattle

SPECIFICATIONS			
Fat range	2 - 40 mm	Power	Internal rechargable batteries with mains adapter
Display	Fat depth Signal indicator Battery indicator	- internal battery capacity	500 measurements
- resolution	1 mm (rounded)		
- type	liquid crystal		
- update rate	5 per second	- recharge time	14 hours
Data Output	Serial data interface	Power Options	•Additional internal battery •External battery pack •External 240V adaptor •External 12V adapter
Size	210 x 100 x 50 mm		
Overall Weight	850g		

APPENDIX
SPECIFICATIONS
1

INFORMATION FROM
DEPARTMENT OF AGRICULTURE
NEW SOUTH WALES

THE P8 RUMP FAT MEASURING SITE

FOR CATTLE

Brian Sundstrom
Cattle Marketing Specialist
Armidale.

March 1987

In NSW the standard fat measuring site has been at the 12/13th rib. While is gives a good description of fatness and is relatively easy to assess in cattle, there are problems measuring rib fat on carcases.

To improve the reliability of carcase fat measuring, a site on the rump – the P8 – has recently been adopted. It is used in the Ausmeat National stock and carcase languages and is recommended for all other situations requiring a single fat measurement.

Compared to the RIB site, the RUMP has:

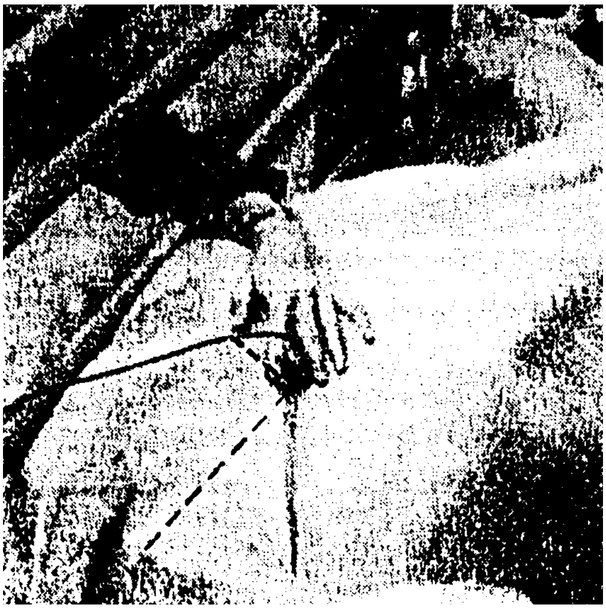
- Firmer fat,
- Less hide puller damage,
- More definite site location.

These add up to:
More reliable carcase measurements.

These pictures are quite difficult to decipher and a search on the internet for the location of the P8 site does not provide too many good diagrams. In order to achieve accurate results, we organised a training session with an accredited scanner.
Producer idea: it would be really great to have a DVD included in the scanner package showing where to find the P8 site on a range of different breeds and classes of cattle and also from different crush/race setups e.g. measuring from the ground beside the animal, from behind or from above (standing on a catwalk beside the race).

P8 SITE LOCATION

The intersection of a line from the ‘pin’ bone (parallel to back bone) with a line at right angles from the ‘highbone’ (3rd sacral vertebra).



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