

From: Gottwald, Thomas [<mailto:Thomas.Gottwald@AftonChemical.com>]

Sent: Wednesday, May 28, 2014 11:35 AM

To: 'Angela Trader Intertek'; Chalkley, Jarrod; Chris Prengaman; Dale Smith (dale.smith@intertek.com); Gottwald, Thomas; 'Gropp, Jerrold'; Hamilton, Larry; Hobson, Kevin; Koehler, Brian P.; Koglin, Cory; Matt Umerley; Schwenk, Daniel; Scott Parke; Warden, Rebecca L.

Subject: L-42 Call Build Notes and Follow-up

Team,

Please see Jay's notes below and the attached documentation notes. I apologize for taking so long to get these out.

In addition to the notes on the attached forms, I plan to ask that Lou be added to the team list and remain involved in the build (at least until the gears are final).

Let me know if you have any changes or additional comments.

Thanks,

Thomas

From: Chalkley, Jarrod

Sent: Friday, May 23, 2014 8:29 AM

To: Gottwald, Thomas

Subject: FW: L-42 Project Quotation - Thomas, for your review & correction.

All,

Thank you again for your time on the phone to discuss the most recent quote from Dana. We have made notes on the original "ASTM Project Requirements" and "ASTM L-42 Project" files and attached them along with the (5) original files from Dana. Below are the meeting minutes captured. Please add/edit anything we missed. We can have a follow-up conference call if necessary to finalize everything prior to contacting Dana, hopefully sooner than later to help expedite this order.

Call-in attendees:

-Larry Hamilton	Lubrizol
-Chris Prengaman	Lubrizol
-Jerry Gropp	Lubrizol
-Rebecca Warden	Southwest
-Dale Smith	Intertek
-Scott Parke	TMC
-Thomas Gottwald	Afton
-Jay Chalkley	Afton

Meeting Minutes:

- Labs agreed that some form of warranty or disclosure is needed. Possibly targeting visual defects and/or if parts are out of spec, labs are not responsible. Include this language in the

PO's. Note: A warranty referencing axle performance was once attempted (L-37 axles), Dana declined, stating that this could not be done due to the axles not being used in normal applications and any form of warranty would expire at the start of the test. Afton to craft agreement and send out to labs for discussion & approvals.

- Labs agreed that Dana plant visits are not required, however they are acceptable as long as the visits do not slow production.
- Labs agreed on forgoing any pilot batch provided all ring and pinions are produced at the same time, from the same heat lot (rings from heat lot A, pinions from heat lot B). After these requirements (including NOT tempered, NOT phosphate coated, NOT shot peened & NO re-laps performed), having acceptable patterns would be the next most important requirement. This should also help expedite the schedule.
- Lou Pappademos from Ft. Wayne NEEDS to be involved with ring and pinion production.
- Labs agreed axle price was in line with expectations however negotiation/clarification needs to be done regarding the \$25,000 project evaluation fee (\$6250/lab).
- Labs agreed to have Dana generate individual quotes for the (4) labs to handle specific needs, i.e. payment terms, quantities, etc.

Respectfully,

Jarrold (Jay) Chalkley
Afton Chemical Corporation
Desk: (804) 788-5082
Cell: (804) 514-9129
Fax: (804) 788-6239

From: Schmalbach, Gary [<mailto:gary.schmalbach@dana.com>]

Sent: Friday, May 16, 2014 5:01 PM

To: Gottwald, Thomas; Chalkley, Jarrod

Cc: Bowler, Frank; Valencia, Antonio; Keddie, Todd; Unrein, Michael; Eakright, Scott; Deany, Timothy; Waxemberg, Gabriel; Ottley, Derek; Lawrence, Gene; Rush, Jon; Wells, Debbra

Subject: L-42 Project Quotation

Hello Thomas, Jay,

Dana is pleased to supply a quotation for the L-42 lubrication testing project. Dana has assembled a team, including a program manager, to ensure appropriate planning and execution are in place throughout the project timeline to produce a successful result. Please find the following attachments:

- Project quotation
- Project time line
- Project requirements
- Project safe launch summary

- Dana's project team.

We will be happy to convene a meeting to discuss any questions you may have regarding our quotation.

Sincerely,

Gary Schmalbach
Senior Account Manager
Dana Off Highway North America

Office 704 871 9351
Mobile 704 252 1015

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Off – Highway Products Group

DANA HOLDING COMPANY
ONE VILLAGE CENTER DRIVE
VAN BUREN, MI 48111

QUOTATION LETTER

ASTM International
100 Barr Harbor Drive
West Conshohocken, PA 19428

To the attention of: Thomas Gottwald, Jarrod Chalkley

Date: May 16, 2014
Subject: Quotation L-42 Axles
No. of pages: 3

Quotation #: 140516

Dear Thomas, Jay

We are pleased to submit to you our offer for the supply of Model 44 Axles for the L-42 lubrication testing project.

1- Product Description and Definition

This product proposal references the L-42 lubrication testing project using Dana Model 44 axles, and specifically Dana part number 044AA100-1.

2- Pricing

\$2977.00

Validation build unit price:	same as above
Project evaluation fee:	to be credited upon receipt of payment for first axles. Needs negotiation and/or clarification
Management fee:	not required

Dana will not invoice labs for axles until proper demonstration has been made that axles meet specifications agreed upon by ASTM and the Dana project team. Labs will not accept any axles that have not met the specification. Any components damaged during manufacturing shall be



Off – Highway Products Group

absorbed by Dana. Labs will not be expected to pay for any losses due to improper assembly or production (i.e. lubrified gears, assembly chips on gears, etc.).

3- Price adjustment

Prices are firm through length of build. Dana will absorb any increases in cost due to currency, raw material, or energy changes.

4- Tooling / Engineering Development & Test (ED&T) and Capital

No tooling / ED&T costs required

5- Volume

This offer is based on a build of 1,400 axles. Labs may agree to purchase any surplus axles at the end of production, if these surplus axles meet the specifications set by ASTM.

6- Payment terms

30 days net from invoicing date. Quote labs individually, payment terms per lab basis.

7- Delivery terms

Ex works Lugoff, SC

8- Packaging

Pallets and other packaging are included

10- Lead times

As per the attached implementation plan. Note that the time line is Dana's best estimate based on supplier feedback, including estimated expedite improvements where applicable. Furthermore, upon receipt of PO, formal material releases will be submitted to our supply base with confirmation of delivery dates and expedite timing where necessary.

Validity of quotation

30 days

On behalf of Dana Off-Highway Products Group we would like to thank you for allowing us the opportunity to quote on your program. Yours faithfully,

Gary Schmalbach
Senior Account Manager
Dana Off-Highway North America



Off – Highway Products Group

Customer:

ASTM - American Society for Testing and Materials

5.0 Work Instruction Steps:

5.1 Orders must be completed without interruption; that is, no changes in setup are allowed.

5.2 Use only the carrier sub-assemblies designated for the order.

5.3 All carrier assembly bearings MUST be of Timken make.

5.4 Any burrs or dings discovered on ring gears or pinions are NOT to be reworked, but the material is to be scrapped.

5.5 Assembly build information, that is, axle serial number and the corresponding build data outlined below, should be legibly recorded on the "belly side" of the carrier and also transferred to a designated spreadsheet and forwarded to the ASTM panel.

Data collection sheets and applicable criteria would be provided at the time of assembly.

5.6 If for any reason it is determined that the actual number of axles produced is projected to be lower than the total number ordered, keep the proportion of axles sent to each lab in the same percentage mix as was ordered.

Notify labs immediately if this is the case, to confirm.

Pinion Bearing and Input Flange Stations:

5.7 Do not use excessive amounts of grease when lubricating the pinion head (inner) bearing.

Air pockets between the cylindrical rollers are acceptable.

5.8 Record the value of the torque-to-rotate (rolling torque) on the carrier.

Example: "R/T 35" signifies 35 in.lbs TTR.

Dynamic Test Station

5.9 Units ARE to be built for gear position rather than noise level.

5.9.1 Do not use excessive amounts of lapping compound for examining the tooth contact pattern.

5.9.2 Use Form No. 90119 - Tooth Contact Pattern Acceptability Chart when evaluating the ring gear and pinion contact patterns. ONLY the type patterns defined below are allowed. They are as follows:

We need to get a copy of Form No. 90119

Drive Side: L3F0, L3F+1, L3F-1, L2F0, L2F+1, L2F-1

Coast Side: L3F0, L3F+1, L2F0

Are we ok with these or do we want them to read per the procedure (i.e. looser tolerances)?

Absolutely NO bunched toe.

5.10 Record the backlash and gear tooth contact pattern for BOTH the drive and coast sides, on the carrier.

Note: Backlash must be .004" - .009"

Example: "B/L .006" signifies .006" backlash.

DL2F-1 signifies lengthwise position "2" and flank position "-1" type pattern on the drive side.

CL3F+1 signifies lengthwise position "3" and flank position "+1" type pattern on the coast side.

Note: Flank position values format must be written with a "+" (positive) or a "-" (negative) prefix for the appropriate values. For example patterns written as "DL2F1" are NOT permitted and should be written as DL2F+1.

Tube Press Station

5.11 Stamp the cover plate surface of the carrier assembly with the assembly Julian date and shift identification. Stamping assembly data on the tube assembly is not required.

Example: "145-05A" signifies "145" as the Julian date "05" as the two-digit year and "A" as the first work shift.

5.12 Do NOT use silicon rubber (RTV) as a cover gasket. Use the gasket specified on the bill of materials.

Please provide documentation referenced in any noted "bill of materials"

5.13 Before installing the cover, mist the inside of the housing with rust preventative oil.

Spray, mainly, the pinion head, ring gear, and differential gears.

An acceptable oil is Osyris 210 S Rust Preventative And Slushing Oil. Any other type must be approved prior to use.

Used Osyris 211S last batch, Dana supplied "Safe Launch" has 211S. Ok to use? Is Osyris 210 S really available?

Paint & Packaging

5.14 Do NOT paint over the assembly information recorded on the carrier.

5.15 Randomly distribute axles between pallets assigned to each lab. Do NOT fill one lab's order then start on the next order.

Example: Place one axle in a pallet for Lubrizol, then the other in a pallet for Parc, then for Southwest Research, Afton, etc., then repeat the sequence from the second pallet, in other words, for a four lab order, fill pallets in the sequence - 1,2,3,4,2,3,4,3,4,4 then repeat.

5.16 Serial tags ARE to be attached to the right axle tube toward the front (input side) and approximately midway between the carrier housing and the spring seats. Tags are not to be placed on the cover assembly.

5.17 Packaging is to consist of 16 axles per pallet, with the outside measurement of a loaded pallet not to exceed 60" high, 53" deep, and 63" wide.

5.18 Place a tag on each pallet with the heat code identification of the ring and pinion. This information will be provided at the time of assembly.

5.19 Install the shipping covers on the tube ends.

Shipping Instructions

5.19 COMPLETED UNITS ARE NOT TO BE STORED OUTDOORS UNDER ANY CIRCUMSTANCE.

5.20 Load the truck with the open end of the pallet facing the trailer doors.

Additional Notes:

o Assembly & Paint

- Batch size of approx 250-500 (1 wk production per month) OK per ASTM
- No sequential 1 pc flow from assy to paint req'd (maintain traceability / quality cert.)
- No sequential 1 pc flow from ctr assy to tube press (maintain traceability / quality cert.)
- Lugoff to use water-based paint

o R&P

- Ring gears from SAE 8620 (single heat code, qualified to spec)
- Pinions from SAE 8620 (single heat code, qualified to spec)
- Blanking, finish cut, HT, lap (single set-up, **resharpen every 300 pcs** - verify w/ ASTM, equiv. quality)
- Check 20-25 ring gears to verify acceptable HT distortion (tooth geom.)
- Ring gears must be approved before pinion processing
- Check 10-15 pinions to verify acceptable HT distortion (tooth geom.)
- **No temper, shot-peen, phoscoat (lubrite), re-lap, burrs or dings**
- Must lap all gear-sets in single lot, and remove all cutter tool marks
- **20 gear-set qualifying run for axle build validation & customer apprv.**

Agreed to leave "300" as acceptable number before resharping.
Was this practice during the last order?

Highlight and ensure production personnel are VERY aware of these differences to prevent unusable axles from being sent to labs

o Carrier

- Casting (continuous run preferred, not mandatory)
- Machining (continuous run not required, set-ups will cover approx 3-6 batches)
- Hi-Lo and square to reduced tolerance

Additions:

Wording needs to be added to address spring seats/pads quality, alignment, etc. Please confirm build notes pertaining to this.

FUNCTION	NAME	RESPONSIBILITY / TITLE	LOCATION	PHONE	E-mail Address
Sales	Gary Schmalbach	Senior Account Manager	Statesville, SC	(704) 252-1015	gary.schmalbach@dana.com
Project Lead	Frank Bowler	Director, Business Development	Maumee, OH	(419) 705-8803	frank.bowler@dana.com
Lugoff Operations	Gabriel Waxemberg	Manager, Manufacturing Engineering	Lugoff, SC	(803) 438-0705	gabriel.waxemberg@dana.com
	Derek Ottley	Manager, Quality	Lugoff, SC	(803) 438-0705	derek.ottley@dana.com
	Gene Lawrence	Manager, Material	Lugoff, SC	(803) 438-0705	gene.lawrence@dana.com
	Rick Treadaway	Manager, Customer Service	Lugoff, SC	(803) 438-0705	rick.treadaway@dana.com
	Tim Deany	Plant Manager	Lugoff, SC	(803) 438-0705	tim.deany@dana.com
Prod. & Appl. Engr.	Steve Bird	Product Engineer	Lugoff, SC	(803) 438-0705	steve.bird@dana.com
	Alex Jacobs	Application Engineer	Maumee, OH	(419) 887-3260	alex.jacobs@dana.com
Supply Chain	Debra Wells	Manager, NA Off-Highway Purchasing	Lugoff, SC	(803) 438-0705	debra.wells@dana.com
	Jon Rush	Sr. Buyer, NA Off-Highway Purchasing	Maumee, OH	(419) 887-5207	jon.rush@dana.com
	Chris Fannin	Buyer, NA Off-Highway Purchasing	Lugoff, SC	(803) 438-0705	chris.fannin@dana.com

SUPPLIERS

High Risk

Carrier Sub-Assembly

Supplier provided capability study for hi-lo and square dimensions
10pc sample layout to be performed by supplier and correlated by Dana

Set - Drive Gear & Pinion

Material certifications to be provided
Supplier to certify gears:
NOT phosphate coated
NOT shot peened
NOT tempered
NO relaps performed

Differential Pinion & Gear

Supplier to provide inspection report and certify for gear mesh

Differential Case

Supplier to supply inspection report and certify for cleanliness

Tube Assembly (rough)

Supplier to certify no tube defects that could hamper spring seat mounting

Medium Risk

Tube Assembly

Supplier to supply inspection report (typical SPC or other inspection report evidence of suitable quality control)
8D corrective action report & evidence for prior tube quality issue resolution (bulge near spring seat weld location)

Low Risk

Select components

Blanket standard communication to suppliers notifying them of significant upcoming, high-profile order with rigorous quality reqmts

Underscoring need for delivery 100% acceptable quality components

Request typical SPC or other inspection report evidence of suitable quality control

ASSEMBLY

No additional or special tooling needed

Assembly follows basic and current process

Retrain operator on gear pattern evaluation (specific for ASTM)

Acceptable patterns - Drive Side: L3F0, L3F+1, L3F-1, L2F0, L2F+1, L2F-1

Coast Side: L3F0, L3F+1, L2F0 (NEED ASTM TO CONFIRM PATTERN REQ'D)

Specific ASTM assembly requirements to be incorporated:

No excessive amounts of grease when lubricating the pinion head (inner) bearing

No excessive amounts of lapping compound for examining tooth contact pattern

Assembly specific data to be recorded/ tracked by serial number & lab - backlash (3places), TTR, pattern evaluation

Desired B/L range (.004 - .009") (NEED TO CONFIRM)

Lube internal components with Osyris 211S

Cover gasket to be used, no RTV

Stamp Julian assembly date on cover mounting face (CONFIRM IF STILL REQUIRED?)

Package axles randomly across all labs subsequent to paint (1 axle at a time per pallet until all filled)

Packaging is to consist of 16 axles per pallet, with the outside measurement of a loaded pallet not to exceed 60" high, 53" deep, and 63" wide.

Each pallet to be tagged with the heat code identification of the ring gear and pinion

ASTM L-42							May	Jun	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	
Action	Notes	Status	Responsibility	Start	End	DAYS													
Customer Inquiry Review	RFQ ASTM L42 (M44) - 1400 pcs	Complete	Gary Schmalbach	5/1/2014	5/2/2014	1	█												
Project Plan	Resources, Requirements, Time Line	Complete	Frank Bowler	5/2/2014	5/16/2014	14	█												
Supplier Lead Times	4.5 mos max lead time from PO	Complete	Gene Lawrence	5/2/2014	5/14/2014	12	█												
Submit Quote	Price, terms, & timing	pending	Gary Schmalbach	5/16/2014	5/16/2014	0													
Receive Customer PO	Per Dana Quote	pending	Rick Treadaway	5/19/2014	5/30/2014	11	█												
Safe Launch Requirments	Communicate to Suppliers	pending	Derek Ottley	5/19/2014	5/30/2014	11	█												
Material Release	Upon receipt of customer PO	pending	Gene Lawrence	5/19/2014	5/30/2014	11	█												
Assy Process Review	On-site Team Review	pending	Gabriel Waxemberg	5/27/2014	5/29/2014	2													
Material Receipts	Air Freight required (7 P/Ns)	pending	Gene Lawrence	6/1/2014	12/28/2014	210		█	█	█	█	█	█	█	█	█	█	█	█
20 pcs Gearset	Validation Sample & Quality Cert.	pending	Gene Lawrence	6/1/2014	10/14/2014	135		█	█	█	█	█	█	█	█	█	█	█	█
20 pcs Carrier	Validation Sample & Quality Cert.	pending	Gene Lawrence	6/1/2014	10/14/2014	135		█	█	█	█	█	█	█	█	█	█	█	█
20 pc Validation Build	2 Set-ups (confirm repeatability)	pending	G.Waxemberg/D.Ottley	10/14/2014	10/21/2014	7					█								
Customer Approval	20 pc Validation Sample	pending	G.Waxemberg/D.Ottley	10/21/2014	11/5/2014	15					█	█							
Release Critical Parts	Per Approved VS target dimensions	pending	Gene Lawrence	11/5/2014	11/5/2014	0													
1520 pcs Gearset	Validation Sample	pending	Gene Lawrence	11/5/2014	11/19/2014	14						█	█						
1520 pcs Carrier	Validation Sample	pending	Gene Lawrence	11/5/2014	12/17/2014	42						█	█	█					
Release Production Build	Per Approved Validation Sample	pending	D.Ottley/G.Lawrence	11/19/2014	4/18/2015	150							█	█	█	█	█	█	█
Assy Batch 1	Ship Batch 1 (1 per month)	pending	Gene Lawrence	11/19/2014	11/26/2014	7						█							
Assy Batch 2	Ship Batch 2 (1 per month)	pending	Gene Lawrence	12/19/2014	12/26/2014	7							█						
Assy Batch 3	Ship Batch 3 (1 per month)	pending	Gene Lawrence	1/18/2015	1/25/2015	7								█					
Assy Batch 1	Ship Batch 4 (1 per month)	pending	Gene Lawrence	2/17/2015	2/24/2015	7									█				
Assy Batch 2	Ship Batch 5 (1 per month)	pending	Gene Lawrence	3/19/2015	3/26/2015	7										█			
Assy Batch 3	Ship Batch 6 (1 per month)	pending	Gene Lawrence	4/18/2015	4/25/2015	7											█		