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October 10, 2008

Via Overnight Delivery

Laura Tarantino, Ph.D.
Food and Drug Administration
Center for Food Safety and Applied Nutrition
Office of Food Additive Safety, HFS-200
5100 Paint Branch Parkway
College Park, Maryland 20740-3835

Re: GRAS Notification for Taiyo-Kagaku's PGFAs

Dear Dr. Tarantino:

Pursuant to proposed 21 C.F.R. § 170.36(c), on behalf of our client, Taiyo-Kagaku Co., Ltd., we hereby notify the Agency of Taiyo-Kagaku's determination, on the basis of scientific procedures in accordance with 21 C.F.R. § 170.30, that use of its polyglycerol fatty acid esters (PGFAs) up to and including the P 40 glycerol esters made from glycerol and glycidol as emulsifiers and cloud inhibitors is generally recognized as safe (GRAS) and therefore exempt from the premarket approval requirements of the Federal Food, Drug, and Cosmetic Act. The reasons for Taiyo-Kagaku's GRAS conclusion regarding its PGFAs are discussed in detail in the company's GRAS Notification, which is enclosed in triplicate.

We trust you will find the three enclosed copies of the notification acceptable. Should any questions arise during the review process, please do not hesitate to contact us, preferably by telephone, so that we may respond as quickly as possible.

Very truly yours,

Melvin S. Drozen

John F. Foley

Enclosures

cc: Kaz Kuroki, Taiyo International, Inc.

000002

Before the
FOOD AND DRUG ADMINISTRATION
Department of Health and Human Services
Washington, D.C.

GRAS NOTIFICATION

Name of Notifier:	Taiyo-Kagaku Co., Ltd.
Post Office Address:	All communications on this matter are to be sent in care of Counsel for the Notifier: Melvin S. Drozen John F. Foley Keller and Heckman LLP 1001 G Street, N.W., Suite 500 West, Washington, D.C. 20001. (202) 434-4222, (202) 434-4186
Name of Substance and Intended Use:	Polyglycerol esters of fatty acids up to and including P 40 glycerol esters made from glycerol and glycidol as emulsifiers and cloud inhibitors
Dated:	October 10, 2008 Melvin S. Drozen John F. Foley Counsel for Taiyo-Kagaku Co. Ltd.

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I. OVERVIEW

Claim of GRAS Status

A. Name and Address of Notifier:

Taiyo-Kagaku Co., Ltd.
800 Yamada-Cho, Yokkaichi
Mie 512-1111 JAPAN

All communications on this matter are to be sent in care of counsel for the Notifier:

Melvin S. Drozen
John F. Foley
Keller and Heckman LLP
1001 G Street, N.W., Suite 500 West
Washington, D.C. 20001.
Telephone: (202) 434-4222, (202) 434-4186

B. Common or Usual Name of the Notified Substance:

Polyglycerol esters of fatty acids.

C. Applicable Conditions of Use:

The subject PGFAs are intended for use as emulsifiers within the meaning of 21 C.F.R. § 170.3(n)(8) at levels ranging from 0.05-0.5% in food, including zinc- or iron-providing dietary supplements; and as cloud inhibitors within the meaning of 21 C.F.R. § 170.3(n)(24) at levels ranging from 0.05-0.5% in vegetable oils and salad oils. The intended uses of the PGFAs as emulsifiers or cloud inhibitors are for the same foods for which PGFAs are permitted for these uses by 21 C.F.R. § 172.854, and are subject to all prescribed conditions/limitations in that regulation except for the description of the regulated additive limiting permitted PGFAs to the decaglycerol esters and less polymerized esters.

D. Basis for GRAS Determination:

The described use of PGFAs up to and including the P 40 glycerol esters made from glycerol and glycidol is generally recognized as safe (GRAS) based on scientific procedures, in

accordance with 21 C.F.R. § 170.30, as discussed more fully in the accompanying summary of the basis for the GRAS determination.

E. Statement of Availability of Data

The data and information that are the basis for the GRAS determination are available for the Food and Drug Administration's review and copying or will be sent to FDA upon request.

* * *

The foregoing and attached information considered, it is respectfully submitted that the use of PGFAs up to and including the P 40 glycerol esters made from glycerol and glycidol as emulsifiers in foods (as permitted by 21 C.F.R. § 172.854) including zinc- or iron-providing dietary supplements and as cloud inhibitors in vegetable oils, salad oils (as permitted by 21 C.F.R. § 172.854) is exempt from the premarket approval requirements of the Federal Food, Drug, and Cosmetic Act because such use is generally recognized as safe.

Respectfully submitted,
Taiyo-Kagaku Co., Ltd.

By:_____
Melvin S. Drozen

_____
John F. Foley
Keller and Heckman LLP
COUNSEL FOR THE NOTIFIER

The subject of this notification is a range of polyglycerol fatty acid esters (PGFAs) up to and including the P 40 glycerol esters made from glycerol and glycidol. The process for making these highly polymerized polyglycerols (PGs) is referred to herein as Process B. The PGFAs made from these PGs are intended for use as emulsifiers within the meaning of 21 C.F.R. § 170.3(n)(8) at levels ranging from 0.05-0.5% in food, including zinc- or iron-providing dietary supplements; and as cloud inhibitors within the meaning of 21 C.F.R. § 170.3(n)(24) at levels ranging from 0.05-0.5% in vegetable oils and salad oils including, for example, such products as diacylglycerol (DAG) oil and "tailored triglycerides".[1] The intended uses of the PGFAs as emulsifiers or cloud inhibitors are for the same foods for which PGFAs are permitted for these uses by 21 C.F.R. § 172.854, and are subject to all prescribed conditions/limitations in that regulation except for the description of the regulated additive limiting permitted PGFAs to the decaglycerol esters and less polymerized esters.

PGFAs made using Process B-derived PGs up to PG 40 are made from and break down into components that are similar (homologous) to the GRAS starting and breakdown components of the PGFAs evaluated by the Joint Expert Committee on Food Additives (JECFA), or by the European Food Safety Authority (EFSA) or the PGFAs described in 21 C.F.R. § 172.854. There is no specific FDA food additive clearance for diglycerol or any more highly polymerized PG but the safety of PGs as a group may be shown from evaluations of polyglycerol polyricinoleic acid (PGPR) and other PGFAs in the context of FDA evaluations for food additive clearance (21 C.F.R. § 172.854) and in GRAS Notifications (GRN No. 9 and GRN No. 179). Although the PGFAs evaluated by JECFA and EFSA were not produced using highly polymerized PG, *e.g.*, PG 30 or PG 40, the results of existing published studies on less polymerized PGFAs (Babayan *et al.* (1964) and Michael and Coots (1971)) indicate that increasing the degree of polymerization should not have an adverse effect on the safety of PG or the PGFAs made from it, as the extent of absorption tends to decrease with the higher polymers. Although glycidol has not been detected in the finished PGs (limit of detection: 20 parts per billion (ppb); analytical report

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[1] "Tailored triglycerides containing approximately 12 percent medium-chain fatty acids" were the subject of GRAS notification No. 217. *See* FDA response letter to GRN 217 (August 20, 2007).

contained in Appendix 2), a risk assessment was conducted assuming, as a worst case, the presence of glycidol in finished PGs at one half the limit of detection, 10 ppb. The risk assessment (contained in Appendix 3) determined that the risk would be less than 1×10^{-9} and therefore negligible, using FDA's extrapolation method or methods used by the Environmental Protection Agency or EFSA.

To support the GRAS status of the intended use of the subject PGFAs, the data and information in this notification have been critically evaluated by a panel of experts (Expert Panel) consisting of four independent scientists, qualified by their relevant national and international experience and scientific training to evaluate the safety of food ingredients. The Expert Panel concluded that under the conditions of intended use in foods described herein, PGFAs up to and including the P 40 glycerol esters made from glycerol and glycidol by Process B that meet appropriate food-grade specifications (per Food Chemicals Codex) and are manufactured and used consistent with current Good Manufacturing Practice (cGMP) are safe and GRAS based on scientific procedures. A summary of the basis for the Panel's conclusion is provided in their report, which is contained in Appendix 1.

Taiyo-Kagaku has determined that PGFAs produced from its PGs and edible fatty acids or fatty acid containing edible oils identified in 21 C.F.R. § 172.854 for use as emulsifiers at 0.05-0.5% in foods (as permitted by 21 C.F.R. § 172.854) including zinc- or iron-providing dietary supplements, and as cloud inhibitors at 0.05-0.5% in vegetable oils and salad oils[2] (as permitted by 21 C.F.R. § 172.854) may properly be deemed GRAS based on scientific procedures based on the conclusions of the Expert Panel and the independent safety evaluation of Dr. Robert Scheuplein of Keller and Heckman's scientific staff. The basis for this conclusion is fully described below.[3]

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[2] Examples of anti-clouding applications for the PGFAs include use in DAG oil and in "tailored triglycerides", as described in GRN 217.

[3] The safety information provided in the safety dossier reviewed by the GRAS panel is virtually identical to the discussion in this document and both documents reference the same scientific publications. A copy of the safety dossier will be provided if requested by the Agency.

II. IDENTITY OF PRODUCT

A. Name, Chemical Description, Physical Description

A PGFA may be defined as a mixture of partial PG esters formed by reacting polymerized glycerol with edible oils or fatty acids. JECFA has recognized that the exact composition of the final product of any PGFA resulting from such a reaction could vary depending on the source of the fats or edible oils used for trans-esterification with the PG mixture. It is expected that the esters could contain mono- and diglycerides.

B. Method of Manufacture

Process B PGs are made using glycerol and glycidol as starting materials. All materials except glycidol used in the manufacturing of Process B-derived PGFAs are food grade. The desired PG is obtained from ring-opening polymerization with glycidol. During this reaction glycidol is heated with a catalyst. The glycidol then reacts with a second molecule, losing water and yielding the diglycerol, which then reacts to give a triglycerol and so on. The reaction process is designed to use up all the glycidol. Taiyo-Kagaku uses Process B to make various PGs with different degrees of polymerization ranging up to PG 40. These PGs are reacted with one of the following: stearic acid, palmitic acid, oleic acid or coconut fatty acid. With the exception of palmitic acid, all of the above fatty acids are listed in Section 172.854, the food additive regulation for PGFAs. The reasoning for considering palmitic acid also to be safe for the intended use is discussed in Section V of the notification, below.

C. Specifications/Quantitative Composition for PGFAs

Taiyo-Kagaku's Process B-derived PGFAs conform to the current FCC monograph for polyglycerol esters of fatty acids. (FCC 6 at 782.) The PGFAs meet the FCC description of PGFAs as "mixed partial esters formed by reacting polymerized glycerols with edible fats, oils, or fatty acids" as well as the FCC's 2 ppm lead limit. There are no other specifications in the PGFA monograph due to the wide range of characteristics that PGFAs may possess, depending on the nature of the edible fats or fatty acids used to make the PGFA and the proportions in

which they are used.[4] The provisions of the FCC monograph do not limit the extent of polymerization of the PG used in the production of PGFAs. Given that glycidol is only theoretically present and that worst-case levels would pose an insignificant risk, Taiyo-Kagaku has concluded that the potential presence of trace levels of glycidol does not present an impurity issue at odds with FCC standards. (*See* discussion, Section IV.D, below.) Therefore, Taiyo-Kagaku has concluded that its Process B-derived PGFAs comply with the FCC monograph for PGFAs.

1. Composition

i. Impurities

Although Process B produces PGs by reacting glycerol with glycidol, no unreacted glycidol is expected to remain in the finished PGs used to make the PGFAs that are the subject of this notification. Nevertheless, since glycidol has been identified as a carcinogen, as a precaution, Taiyo-Kagaku has analyzed PGs made by Process B for glycidol residues.[5] At a detection limit of 20 ppb no glycidol was detected in Process B PG samples, regardless of the degree of polymerization.[6] However, as explained in Section IV.D, below, even if we assume

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[4] The FCC explains that, due to the "large and diverse class of products that may be obtained" by varying the proportions as well as the nature of fats or fatty acids used to make PGFAs, beyond establishing a lead limit, the specifications for PGFAs (including acid value, hydroxyl value, iodine value, residue on ignition, saponification value and sodium salts of fatty acids) "should conform to the specifications of the vendor". FCC 6 at 782.

[5] There is no similar concern with the potential presence of glycerol residues in the PGs since glycerol is listed by FDA as GRAS with no limitation other than good manufacturing practice (21 C.F.R. § 182.1320). Thus, use of glycerol in the production of PG raises no safety concern *vis-à-vis* either the PG or PGFAs made therefrom.

[6] The analysis of glycidol residues is found in an August 31, 2007 analytical report prepared for Taiyo-Kagaku by Daicel Chemical Industries, Inc., titled "Analysis of Residual Glycidol in Glycidol-derived Polyglycerin", a copy of which is included in Appendix 2. This report discusses the results of LC/MS/MS analysis of three samples (from different lots) of PG 10 (*i.e.*, PG with a degree of polymerization of 10) produced by Process B and three samples (from different lots) of PG 40 (*i.e.*, PG with a degree of polymerization of 40) made by Process B. According to the August 31 report, the LC/MS/MS analytical method allows the quantification of glycidol at concentrations down to 60 ppb and detection of the presence of glycidol down to 20 ppb. The report concludes that no glycidol was detected in any of the PG 10

(continued ...)

the presence of the maximum concentration of glycidol that could theoretically be present in Process B PGFAs without regard to any reduction due to esterification,[7] exposure to the impurity through the intended uses of Process B-derived PGFAs would present a negligible safety risk. All Process B-derived PGFAs, regardless of the edible oil used or the degree of polymerization of the PG employed, are subject to the same limits for lead (no more than 2 ppm) and glycidol (LOD: 20 ppb).

III. EXPOSURE TO PGFAs

A. Estimated Daily Intake of PGFAs

1. PGFA intake from conventional food (excluding dietary supplements)

Total dietary intake of PGFAs from their use (1) as emulsifiers at levels ranging from 0.05-0.5% in foods (excluding zinc- or iron-providing dietary supplements), as permitted by 21 C.F.R. § 172.854, and (2) as cloud inhibitors at levels ranging from 0.05-0.5% in vegetable oils and salad oils, as permitted by 21 C.F.R. § 172.854, may be estimated from total PGFA production figures in the United States.

Use of total PGFA figures is appropriate since, in light of the toxicological similarity of each member of the PGFA family, exposure is properly considered as a group. According to the listing in "Food Additives Toxicology, Regulation, and Properties",[8] the total amount of PGFAs

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or PG 40 samples. Thus, the Process B PGs, and, hence any PGFAs made from them, may contain, at most, only trace concentrations of glycidol below 10 ppb.

[7] The esterification process is expected to minimize or eliminate the presence of glycidol in finished PGPR made from Taiyo's polyglycerols. A similar point was made in GRN No. 179, with regard to the impact of the interesterification process on the potential levels of epichlorohydrin (a starting material in the production of the PG used to make the notified PGPR) in the finished emulsifier. *See* FDA's January 20, 2006 response to GRN No. 179, which describes the notifier's (Stepan Company) explanation that the original concentration of epichlorohydrin in the PG is greatly reduced in the finished PGPR and far below detectable limits in foods using the PGPR.

[8] Clydesdale, F (1966), "Food Additives Toxicology, Regulation, and Properties".

sold in the United States in 1987 was 158,000 pounds. We increased this reported poundage by 60% to 263,300 pounds to allow for possible under reporting as recommended by FDA. This is equivalent to [263,300 pounds/year]÷[231 million persons] = 1.14×10^{-3} pounds/person/yr or 0.517g/p/yr or 517 mg/p/yr or [517 mg/p/yr] ÷[365 days/yr] = 1.42 mg/p/day. Taiyo-Kagaku assumes that poundage and the population have both increased proportionally since 1987, keeping the per capita consumption the same. To approximate 90th percentile intake of PGFAs in food, we attribute the adjusted poundage figure to 10% of the population, increasing the estimated consumption from 1.42 mg/p/d to 14.2 mg/p/d.

Taiyo-Kagaku has separately considered dietary intake of PGFAs from their use as emulsifiers in zinc- or iron-providing dietary supplements since the FDA-recommended 60% adjustment of total production poundage from 1987 is not intended to take into account significant new uses of an ingredient that have arisen since the original poundage survey.[9] Therefore, for intake estimate purposes, Taiyo-Kagaku is treating use of its PGFAs in dietary supplements as if it were an entirely new use of PGFAs over and above the 14.2 mg/p/d consumption estimate based on the updated/adjusted 1987 total production figure of 263,300 pounds of PGFAs.

2. PGFA intake from supplements

The subject PGFAs are intended for use by supplement manufacturers in making zinc and iron preparations that are incorporated into dietary supplements, specifically tablets or capsules, for consumers who wish to augment their levels of these essential nutrients. The PGFAs are not intended for use in preparations for any other minerals. The PGFAs provide their maximum emulsifying effect at a level approaching or equaling the concentration of iron or zinc in the mineral preparation. On this basis, the PGFAs are expected to make up 0.5% to 5% of the mineral preparation (not the finished zinc or iron tablet or capsule). At higher concentrations the emulsifier would not provide any additional technical benefit so cost considerations can be

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[9] PGFAs presumably were used in dietary supplements at the time of the 1987 poundage survey, but we think it is reasonable to assume that consumption of dietary supplements as a whole, including those in which PGFAs such as those that are the subject of this notification may be used, has increased substantially in the last 20 years.

expected to induce supplement manufacturers to limit PGFA use levels to the concentration of zinc and iron in the mineral preparation that they use in their zinc and/or iron supplement.

We have calculated the use level of PGFA in iron and zinc supplements from the estimated consumption of the supplement and the concentration of PGFA used in the supplement. The maximum use level of the supplement is based on the tolerable upper level (ULs) intakes established by the National Institutes of Health's (NIH) Office of Dietary Supplements for both zinc and iron supplements.[10] This is the highest level at which the supplement can be consumed safely according to NIH. It is defined precisely as:

> *the highest level of daily nutrient intake that is likely to pose no risk of adverse health effects for almost all individuals. Although members of the general population should be advised not to routinely exceed the UL, intake above the UL may be appropriate for investigation within well-controlled clinical trials.*[11]

These UL estimates are, of course, far greater than the Recommended Dietary Allowances (RDAs) for the minerals.[12] Since (1) the 90th percentile intakes for supplements are not available, (2) the consumption of supplements by many individuals may exceed recommended levels, and (3) the recommended levels on the product labels themselves may be aberrant, we believe that the use of ULs provides a conservative and rational measure of potential maximum exposure for most consumers.

For adults, the zinc UL is 40 mg/day.[13] Based on the NIH Dietary Reference Intakes, the RDA for zinc for men is 11 mg/p/d and for adult women is 8 mg/p/day.[14] The RDA for young

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[10] NIH, Dietary Reference Intakes for Vitamin A, Vitamin K, Arsenic, Boron, Chromium, Copper, Iodine, Iron, Manganese, Molybdenum, Nickel, Silicon, Vanadium, and Zinc (2000) Food and Nutrition Board, Institute of Medicine.

[11] *Id.* at 481.

[12] *Id.*

[13] *Id.*

women during pregnancy increases to 10.5 mg Zn/day and during lactation is 13 mg Zn/day.[15] Thus the UL exceeds the RDA by approximately 4-fold. The median dietary intake of zinc in the United States is approximately 9 mg/day for women and 14 mg/day for men.

For adults the iron UL is 45 mg/day and the RDA for all age groups of men and post-menopausal women is 8 mg/day, and for pre-menopausal women is 18 mg/day.[16] The UL exceeds the RDA by nearly 6-fold. The median dietary intake of iron is approximately 16 to 18 mg/day for men and 12 mg/day for women.

Assuming that a consumer ingests both zinc and iron supplements daily, the maximum safe UL level for zinc and iron supplements combined is 40 mg (Zn) + 45 mg (iron) = 90 mg. As discussed above, the PGFAs provide their maximum emulsifying effect at a level approaching or equaling the concentration of iron or zinc in the mineral preparation. Accordingly, a reasonable estimate for PGFA intake from supplement use would be 90 mg/day. However, based on internet research, we have found that daily dosage recommendations for supplements vary and there are at least a few supplement products with recommended daily dosages as high as 150 mg for zinc and 50 mg for iron.[17] While it is unlikely that many consumers will select products providing the extreme high levels of both these supplements, we think it is prudent to double our estimate of 90 mg/day to 180 mg/day PGFA from supplement use to provide for this possibility.

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[14] *Id.*

[15] *Id.*

[16] *Id.*

[17] For example, labeling for "Ocuvite PreserVision" (described as a "Uniquely Formulated Eye Vitamin and Mineral Supplement") recommends four tablets daily, each tablet containing 35 mg zinc (http://www.drugstore.com/products/prod.asp?pid=73954&catid=20141); labeling for "Mega Zinc 100 mg - Sustained Release", by Nature's Plus, recommends a daily tablet containing 100 mg zinc (http://www.evitamins.com/product.asp?pid=3923); and labeling for "Ultimate Iron", by Enzymatic Therapy, recommends daily consumption of two softgels each containing 25 mg iron (http://www.evitamins.com/product.asp?pid=9233).

3. Total intake of PGFAs from intended use

Combining the food additive and iron/zinc supplement uses and conservatively neglecting any substitutional reduction in exposure, an upper bound on the total maximum estimated intake of PGFAs from Process B-derived polyglycerols is 180 mg/p/d (dietary supplement) + 14.2 mg/p/d (all other food uses) = 195 mg/p/day or 2.79 mg/kg bw/day.

IV. SAFETY OF PGs AND PGFAs

A. Absorption, Distribution, Metabolism, and Excretion

Michael and Coots (1971)[18] reported on the metabolism of PGFAs produced from PG 3 through PG 10. The study found that all the PG esters in this range were hydrolyzed to their PG backbones and the fatty acids. While the fatty acids were absorbed and catabolized, the PGs were reasonably well absorbed but not utilized (catabolized) and excreted unchanged. On the basis of the failure of PG 3-10 to be catabolized, it is reasonable to assume that higher PGs, including PG 11-PG 40, also will not be catabolized and therefore should not raise any distinct safety concern when compared with less polymerized PGs. Based on the work of Michael and Coots, when PGFAs produced from the higher PG oligomers (such as PG 11-PG 40) are ingested, the PG, *per se*, will either not be absorbed at all or will be partially absorbed and excreted since the increased molecular size of the PG, coupled with the apparent resistance of PGs to enzymatic attack, will probably decrease, if not prevent, absorption.

B. Toxicological/Safety Studies

As discussed in Section II.B, Taiyo-Kagaku uses Process B to make various PGs with different degrees of polymerization ranging up to PG 40. Although there is no specific FDA food additive clearance for diglycerol or any more highly polymerized PG, Taiyo-Kagaku believes that the safety of PGs as a group is evident from evaluations of PGPR (the PG ester of ricinoleic acid) and other PGFAs, both in the context of FDA evaluations (for food additive clearance and GRAS notifications), and evaluations by JECFA and the EU's Scientific Committee for Foods (SCF) (now the European Food Safety Authority's Scientific

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[18] Michael WR and Coots RH. Metabolism of polyglycerol and polygylcerol esters. *Toxicol. Appl. Pharmacol.* **20(3):**334-345 (1971).

Committee).[19] For toxicological purposes, these evaluations of PGPR and PGFAs effectively address the safety of the components of PGs and the potentially absorbed metabolites of ingested PGs, with the exception of any distinctive impurities, such as the glycidol noted above, that may arise as artifacts of the particular starting materials used to produce the PGs. Taiyo-Kagaku has concluded that JECFA's evaluation of PGFAs, which established an acceptable daily intake (ADI) of 25 mg/kg bw, or 1.75 g/p/d (25 mg/kg x 70 kg = 1.75 g/p/d), supports the safety of PGs.

The JECFA ADI for PGFAs is principally based on the toxicity of the PGs and other polymeric components of the PGFAs since the other major metabolites—glycerol and the fatty acids—are considered safe at significantly higher levels. JECFA initially evaluated PGFAs in 1967 and conducted a second evaluation in 1974 based on the availability of additional safety data. The 1967 evaluation relied, among other things, on a two-year rat feeding study and a second, 22-week rat study. JECFA's 1974 evaluation considered both unpublished data that the Committee had previously reviewed and two subsequently completed studies that were published in a peer-reviewed journal. One of these published studies is a 90-day study on deca glycerol deca oleate, PGE(10) = PGFA (with the deca-glycerol and the deca-oleate) (King, Michael and Coots, 1971[20]), which shows that PGE(10) fed to rats at doses as high as 10% is safe but that the feed efficiency is less due to the poor absorption of the higher polyglycerol esters, PGE(10). The other published research reviewed by JECFA in 1974 is the Michael and Coots (1971) metabolism study, discussed in Section IV.A, above, which shows that the polyglycerol ester in PGFAs is poorly absorbed and that absorption decreases as the degree of polymerization of the polyglycerol increases.

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19 WHO Food Additive Series 5, 25 June 1973 Meeting of JECFA; 7th Series Reports of Scientific Committee for Foods, 1978.

20 King WR, Michael WR, and Coots RH. Subacute oral toxicity of polyglycerol ester. *Toxicol Appl Pharmacol* **20(3):** 327-333 (1971).

In addition to JECFA's reviews, the safety of the PG component of PGPR was also established without challenge by FDA in GRNs Nos. 9 and 179[21] as well as the Agency's evaluation of PGFAs that led to the creation of the food additive regulation for PGFAs (21 C.F.R. § 172.854). Since the PGFAs evaluated by either FDA, JECFA or the SCF all contain some free PGs and metabolize in the body into a mixture of glycerol, PGs, fatty acids and other intermediate polymeric substances, Taiyo-Kagaku has concluded that these evaluations provide assurance of the safety of PGs, *per se*.

C. Safety of PGFAs

As discussed above, JECFA has established an ADI of 25 mg/kg bw for PGFAs, the SCF endorsed the same level through separate evaluation and FDA has acknowledged the safety of certain PGFAs via its favorable responses to GRNs No. 9 and No. 179 for PGPR as well as the Agency's evaluation of PGFAs pursuant to the establishment of Section 172.854. The PGFAs that were evaluated by these bodies were not, however, produced using highly polymerized PG, *e.g.*, PG 30 or PG 40. Nevertheless, the results of the existing safety studies on PGFAs indicate that increasing the degree of polymerization should have no adverse effect on the safety of the PG, itself, or PGFAs made from it.

D. Safety of Glycidol Used to Produce Taiyo-Kagaku's PGs

1. Exposure to glycidol residues

As noted above, glycidol is not expected to be present in the finished PGs made by Process B, and, indeed, has not been detected. However, as discussed below, glycidol is a carcinogen, and, therefore, as a precaution, the safety of glycidol residues below the detection limit has been evaluated. To provide additional assurance of the safety of the Process B PGs and PGFAs made using them, Taiyo-Kagaku has evaluated the worst-case risk that would be posed

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[21] *See* FDA's April 2, 1999 response to GRN No. 9 for PGPR, submitted by Quest International; and the Agency's January 20, 2006 response to GRN No. 179 for PGPR, submitted by Stepan Company. GRN No. 9 concerned PGPR intended for use as an emulsifier in chocolate. The subject of GRN No. 179 was a PGPR intended for broader uses than the GRN 9 product and, more importantly, made by a distinctive process in which the PG component may be made by polymerization of epichlorohydrin, which has been classified as a probable human carcinogen by IARC and NTP, among other organizations.

by the maximum level of glycidol that could be present in the PGs based on the detection limit of analyses for glycidol residues. Thus, based on the detection limit of 20 ppb, Taiyo-Kagaku hypothetically assumes that glycidol may be present at 10 ppb, on average,[22] in both PGs made by Process B and in PGFAs made from those PGs.

Based on a 195 mg/day estimate for PGFA intake and the 10 ppb maximum level for glycidol in PGFA, the worst-case anticipated daily intake of the glycidol will be 0.195 g/day × 0.01 microgram/g = 1.95 nanogram/day. Translated to an equivalent dietary basis this intake corresponds to 1.95 nanogram/1.5 kg = 1.3 parts per trillion (ppt).[23] As explained in Section 5, below, this trace intake of glycidol would pose a negligible cancer risk—well below the 1×10^{-6} risk generally considered to be insignificant by FDA and to be of no regulatory or toxicological concern. It should be noted that FDA did not object to the theoretical presence of a toxicologically insignificant carcinogenic residue in similar circumstances in the case of GRN No. 179 for PGPR.[24]

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[22] This assumed worst-case level is in keeping with FDA's practice of estimating that the average level of contamination is one-half the detection limit. *See* FDA. Memorandum from Mike DiNovi, Chemistry Review Branch, to Biotechnology Branch re Use of Non-detect Data in Exposure Estimation (Nov. 9, 1994).

[23] For purposes of estimating intake, FDA assumes that the daily diet is 3 kg, split evenly between liquid and solid food. Although some of the intended uses of the Process B polyglycerols and PGFAs will be in solid foods and some will be in liquid foods, we are using the 1.5 kg figure, rather than the 3 kg total daily diet figure, to estimate exposure to apply additional conservatism to our intake estimate and because it may be closer to the actual portion of the daily diet reflected in the intended uses.

[24] The PGPR addressed by GRN No. 179 was preferentially made using as a starting material the carcinogen epichlorohydrin. As is true of Taiyo's PGFAs *vis-à-vis* glycidol, the presence of epichlorohydrin in foods using the finished emulsifier was expected to be minimal (negligible and below detectable limits). *See* FDA's January 20, 2006 response to GRN No. 179.

2. Carcinogenicity of glycidol

Carcinogenicity studies of glycidol were conducted by the National Toxicology Program (NTP) and the final NTP Technical Report TR 374 was published in March 1990.[25] Glycidol (94% pure) was tested in a two-year study in rats at doses of 0, 37.5 and 75 mg/kg bw/day, and in a two-year study in mice at doses of 0, 25 and 50 mg/kg bw/day. Doses were administered in distilled water by gavage, 5 days per week for 103 weeks.

Under the conditions of the two-year gavage studies there was *clear evidence of carcinogenic activity* in both rats and mice of both sexes. Multiple organ sites were affected in both mice and rats. These included increased incidences of mesotheliomas of the tunica vaginalis, fibroadenomas of the mammary gland, gliomas of the brain, and neoplasms of the forestomach, intestine, skin, Zymbal gland and thyroid gland in F344/N rats; and increased incidences of neoplasms of the Harderian gland, forestomach, skin, subcutaneous tissue, liver, lung, mammary gland and uterus in B6c3F1 mice.

3. Cancer hazard assessment of glycidol

We reviewed the Analysis of Primary Tumor Tables in the NTP bioassays of the rat and mouse and selected for risk assessment those tumor types that gave the highest risk (lowest dose for a given risk).[26] These tumors in male rats were mesotheliomas of the tunica vaginalis (mesothelium of the abdominal cavity) occurring at an overall rate of 39/50 (78%) and at an effective rate of 39/47 (83%).[27] In female rats the most prevalent tumors were fibroadenomas or adenocarcinomas of the mammary gland occurring at an overall rate of 37/50 (74%) and at an effective rate of 37/48 (77%). The most prevalent tumors in male mice were hepatocellular adenomas or carcinoma occurring at an overall rate of 35/50 (70%) and at an adjusted rate of 84.9%. In female mice the most prevalent tumors were found in the Harderian gland.

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[25] NTP Technical Report Toxicology and Carcinogenesis Studies of Glycidol in F344/N Rats and B6C3F1 Mice (Gavage studies) NTP TR 374.

[26] Tables A3, B3, C3, and D3 in NTP TR 374.

[27] NTP defines the effective rate as the number of tumor bearing animals ÷ the number of animals alive at the first occurrence of the tumors in any of the three groups.

Adenomas or carcinomas occurred at an overall rate of 40/50 (80%) or at an adjusted rate of 86.8%. These results are tabulated in Table 1, below.

Table 1

Most Prevalent Tumors in Two-Year NTP Cancer Bioassays of Glycidol

Species	Organ	Tumor Type	Incidence		
RATS			**0**	**37.5**	**75**
Male	Tunica vaginalis	All mesothelioma	3/50	34/50	39/50
Female	Mammary gland	Adenoma or carcinoma	14/50	34/50	37/50
MICE			**0**	**25**	**50**
Male	Liver	Adenoma or carcinoma	24/50	31/50	35/50
Female	Harderian gland	Adenoma or carcinoma	4/46	11/43	40/50

Tumor incidence is given at three doses: 0, 37.5 and 75 mg/kg bw/d in rats and 0, 25 and 50 mg/kg bw/d in mice

The quantitative risk assessment calculations were conducted on these four tumor types. This tumor selection focuses the risk assessment on the most sensitive tumors in the animals and yields the lowest safe doses.

4. Quantitative risk assessment of glycidol

The details of the quantitative risk assessment are presented in Appendix 3 to this document. The rat mesotheliomas were the most sensitive end point. Based on the benchmark dose procedure used both by EPA and FDA the insignificant risk level (10^{-6}) was calculated. A one in a million lifetime risk of cancer (10^{-6}) corresponds to a dose level of 3.5×10^{-5} mg/kg bw/day and to a human intake of **2.45 µg/day** (70 kg bw human) and to a dietary concentration of **1.63 ppb.**

5. Risk of glycidol impurity levels in product

The impurity analysis conducted by Taiyo-Kagaku on Process B PG found no detectable levels of glycidol with a detection limit of 20 ppb.[28] It is FDA policy to estimate that the average level of contamination is one-half the detection limit, which in this case would be 20 ppb/2 = 10 ppb. We shall assume that 10 ppb will be the average level of glycidol in PGs synthesized by Process B and derivatives of the PGs (*i.e.*, PGFAs). For the sake of conservatism, we are assuming the same level of glycidol residues in PGFAs made from PGs produced by Process B as in the PGs themselves despite the strong likelihood that esterification of Process B-derived PGs will significantly reduce glycidol levels. *See* discussion in footnote 7, *supra*.

We have shown above that an intake of 2.1 μg glycidol /day is equivalent to a theoretical, lifetime cancer risk of one in a million (or a 10^{-6} risk). Since the risk is proportional to the dose, the cancer risk corresponding to any amount of glycidol can be calculated from the ratio of the estimated daily intake of glycidol in μg/day to the daily intake (= 2.45 μg/day) corresponding to a 10^{-6} risk:

Risk = 10^{-6} × (glycidol intake in μg/day)/(2.45 μg/day)

For example: corresponding to the 195 mg/day estimated intake of polyglycerol, the intake of glycidol is 0.195 g/d x 0.01 μg/g = 1.95 nanogram/day. The theoretical lifetime cancer risk would be: (10^{-6} × (0.00195 μg)/2.45 μg/day) = 8×10^{-10}. This concentration of glycidol is trivial. As shown below, even if the use level of the PGFAs were at the full ADI of 1.75 g/p/d, the risk would be far below 10^{-6}:

Risk (at the ADI for PGFA) = (10^{-6}) × (1.75 g/day × 0.01 μg/g /(2.45 μg/day) = (10^{-6}) × (0.0175/2.45) = 7.1×10^{-9}.

Thus there is no significant risk from the trace levels of glycidol in the final product.

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[28] As discussed in section C.1.i, above, according to Daicel Chemical Industries, Inc.'s August 31, 2007 analytical report titled "Analysis of Residual Glycidol in Glycidol-derived Polyglycerin", a copy of which is included in Appendix 2, no glycidol was detected in samples of PG 10 and PG 40 made by Process B based on LC/MS/MS analysis with a detection limit of 20 ppb.

V. GRAS STATUS OF PGFAs MADE FROM TAIYO-KAGAKU's PGs

Taiyo-Kagaku has concluded that FDA's regulation for PG esters of fatty acids (21 C.F.R. § 172.854), the published research of Babayan *et al.* (1964), Michael and Coots (1971) and King, Michael and Coots (1971) regarding the safety of less polymerized PGs and published safety evaluations of both JECFA, *i.e.*, the 1974 JECFA monograph for PGFAs, and the EU's SCF (7th Series Reports, 1978) support the safety of PGFAs made from Taiyo-Kagaku's Process B-derived PGs at the intended levels of use in food. In addition, the company believes that it has demonstrated that the worst-case intake of glycidol from its potential carry-over presence in Taiyo-Kagaku's PGFAs is safe. Therefore, Taiyo-Kagaku has concluded that such PGFAs may properly be deemed GRAS based on the combination of the published safety evaluations of the food safety experts of JECFA and the SCF, and the recognized safety of the individual components of PGFAs (*i.e.*, PG and edible fatty acids) and the metabolites formed from PGFAs upon ingestion.

As discussed above, PGPR has successfully gone through the GRAS notification process on two occasions.[29] PGPR and the PGFAs differ significantly only in the fact that, in PGPR, PG is esterified with ricinoleic acid, whereas, in PGFAs, edible fatty acids, like stearic, oleic and palmitic, are used. The PG portion of the molecule is the same in both cases and the GRAS status of PG in PGPR is evidenced by FDA's favorable response to both GRN No. 9 and GRN No. 179 the Quest GRAS Notification for PGPR.

Regarding the use of Process B derived PGs with a high degree of polymerization, as discussed in Section IV.A, above, based on the published research of Michael and Coots (1971), demonstrating that PGs ranging from PG 3 to PG 10 are not catabolized, it is reasonable to assume that, when more highly polymerized PGs, such as PG 40, are used to make PGFAs, upon ingestion of the PGFAs, the PG, *per se*, will either not be absorbed at all or will be partially absorbed and excreted since the increased molecular size of the PG, coupled with the apparent resistance of PGs to enzymatic attack, will probably decrease, if not prevent, absorption. On this

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[29] *See* FDA's April 2, 1999 response to GRN No. 9 for PGPR, submitted by Quest International; and FDA's January 20, 2006 response to GRN No. 179, submitted by Stepan Company.

basis, use of PGs between PG 11 and PG 40 to produce PGFAs should not raise any distinct safety concern when compared with use of less polymerized PGs. This is also the opinion of the Expert Panel that independently reviewed the safety of the glycidol process for polyglycerol and the PGFAs made from this polyglycerol. *See* Expert Panel report in Appendix 1.

The only exogenous components are the artificially produced polymers of glycerol, which are found both in PGPR and in PGFA and esters between these polymers. The polymeric PGPR and PGFA are both resistant to digestion, but to the extent they are digested, the metabolites of both substances include a large group of closely related compounds, virtually all of which are found as normal constituents of the human diet. Thus, GRN No. 9 submitted by Quest for PGPR and GRN No. 179 submitted by Stepan Company for a differently produced PGPR provide additional support for the GRAS status of PGFAs, including those made by Taiyo-Kagaku from PGs made by Process B. Although glycidol was not an impurity in the PGPR considered by FDA in GRN No. 9, the PGPR that was the subject of GRN No. 179 used another carcinogen, epichlorohydrin, as a starting material. Stepan Company was able to conclude that the potential presence of epichlorohydrin in the finished PGPR would be so low as to be toxicologically insignificant. *See* January 20, 2006 FDA response to GRN No. 179. Similarly, Taiyo-Kagaku has confirmed via quantitative risk assessment that even at worst-case residue and intake levels (using the 1.75 g/d ADI of PGFAs as an intake ceiling), maximum potential glycidol levels would be safe, *i.e.*, would be far below 1×10^{-6} cancer risk:

$$(10^{-6}) \times (1.75 \text{ g/day} \times 0.01 \ \mu\text{g/g} / (2.45 \ \mu\text{g/day}) = (10^{-6}) \times (0.0175/2.45) = 7.1 \times 10^{-9}.$$

(*See* Appendix 3.)

As previously mentioned, Taiyo-Kagaku's PGFAs are produced by reacting a PG with one of several edible fatty acids, namely stearic acid, palmitic acid, oleic acid or coconut fatty acid, all of which, except for palmitic acid, are listed in Section 172.854, the PGFA food additive regulation. Regarding the safety of such non-PG components of Taiyo-Kagaku's PGFAs, FDA recognizes the GRAS status of many fatty acids and substances that produce fatty acids when metabolized. For example, ascorbyl palmitate is GRAS as a chemical preservative in food, 21 C.F.R. § 182.3149. Zinc stearate is GRAS as a nutrient (Section 182.8994) and stearic acid is GRAS (Section 184.1090) in commercially hydrogenated fats, as a flavoring agent and as an

adjuvant. Linoleic acid is GRAS (Section 184.1065) as a flavoring agent and a nutrient supplement, and may be used in infant formula. Mono- and diglycerides made from lauric, linoleic, myristic, oleic, palmitic and stearic acids are GRAS (Section 184.1505) for a variety of uses in food, and as noted above, release these acids when metabolized. Thus, FDA regulations support the safety and GRAS status of the intended use of stearic acid, palmitic acid, oleic acid or coconut fatty acid in the production of PGFAs.

In summary, Taiyo-Kagaku believes that PGFAs produced from its Process B PGs are safe and may be deemed GRAS in light of the following considerations. First, the metabolic products from both PGPR and PGFAs produced from PG that are absorbed are toxicologically indistinguishable and are well recognized, normal body constituents and many are affirmed as GRAS by FDA. Second, the PG portion of the molecule is very similar in both series of esters and is regarded as GRAS under the Quest Notification for PGPR (GRN No. 9) and has also been deemed safe at much higher intakes in published reports prepared by such qualified food safety experts as JECFA and the SCF. Third, quantitative risk assessment following FDA standards assures the safety of trace levels of glycidol potentially present in Taiyo-Kagaku's PGFAs. Fourth, the polymeric portions of the esters that are not absorbed appreciably, both in the case of PGPR and PGFA, are toxicologically equivalent.

VI. CONCLUSION

Taiyo-Kagaku has concluded that use of PGFAs up to and including the P 40 glycerol esters made from glycerol and glycidol and reacted with stearic acid, palmitic acid, oleic acid or coconut fatty acid, are safe and can properly be deemed GRAS based on scientific procedures for use as emulsifiers at typical use levels 0.05-0.5% in various foods, including zinc and iron-providing dietary supplements, and to inhibit clouding at typical use levels 0.05-0.5% in vegetable oils and salad oils, such as DAG oil and "tailored triglycerides", as described in GRN 217.

VII. LIST OF APPENDICES

Appendix 1. Report of the Expert Panel on the GRAS Status of Process B-Derived PGFAs

Appendix 2. "Analysis of Residual Glycidol in Glycidol-derived Polyglycerin", Daicel Chemical Industries, Inc.

Appendix 3. Quantitative Risk Assessment for Glycidol

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Appendix 1

Appendix 1

Report of the Expert Panel on the GRAS Status of Process B-Derived PGFAs

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REPORT OF THE EXPERT PANEL ON THE GENERALLY RECOGNIZED AS SAFE (GRAS) STATUS OF PROCESS B-DERIVED POLYGLYCEROL ESTERS OF FATTY ACIDS (PGFAS)

INTRODUCTION

Taiyo-Kagaku, Inc. (Taiyo), convened an Expert Panel (the "Panel") of independent scientists, qualified by their relevant national and international experience and scientific training to evaluate the safety of food ingredients, to conduct a critical and comprehensive evaluation of the available pertinent data and information on Process B-derived polyglycerol esters of fatty acids (PGFAs), and determine whether, under the conditions of intended use as emulsifiers and cloud inhibitors, PGFAs are safe and would be Generally Recognized As Safe (GRAS) based on scientific procedures. The Panel consisted of the following qualified scientific experts: Prof. Joseph F. Borzelleca, Ph.D. (Virginia Commonwealth University, Medical College of Virginia), Prof. Robert J. Nicolosi, Ph.D. (University of Massachusetts Lowell), Prof. Michael W. Pariza, Ph.D. (University of Wisconsin- Madison), and Walter Glinsmann, M.D. (President, Glinsmann Associates). *Curricula vitae* of the Panel are provided in Attachment 1.

The Panel, independently and collectively, critically examined a comprehensive package of data and information compiled from the literature and other published sources through June 2006 ("GRAS Dossier") prepared by Dr. Robert Scheuplein, staff toxicologist at Keller & Heckman. The Panel also evaluated other information deemed appropriate or necessary. The Panel evaluated information pertaining to the method of manufacture and product specifications, supporting analytical data, intended use-levels in specified food products, consumption estimates for all intended uses, and a comprehensive assessment of the available scientific literature pertaining to the safety of hardy PGFAs, (i.e., PGFAs made using more highly polymerized polyglycerols (PGs), e.g., PG 11 to PG 40).

Following independent, critical evaluation of such data and information, the Panel unanimously concluded that under the conditions of intended use in foods described herein, Process B-derived PGFAs meeting appropriate food-grade specifications and manufactured and used consistent with current Good Manufacturing Practice (cGMP), are safe and GRAS based on scientific procedures. A summary of the basis for the Panel's conclusion is provided below.

MANUFACTURE

Process B PGFAs are produced from glycerol (FDA GRAS; limitation is cGMP) and glycidol (a liquid used as a stabilizer in the manufacture of vinyl polymers; reported by NTP to be a carcinogen in mice and rats). The process involves heating the glycidol with a catalyst, removing water, forming di- and triglycerols and ring-opening polymerization with glycidol. Taiyo-Kagaku uses Process B to make various PGs with different degrees of polymerization up

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to PG 40. These PGs are reacted with either stearic, palmitic, oleic, or coconut fatty acids. With the exception of palmitic acid, all the above fatty acids are listed in Section 172.854, the food additive regulation for PGFAs.

SPECIFICATIONS/QUANTITATIVE COMPOSITION

Taiyo-Kagaku has affirmed to Keller and Heckman that its batch analyses and specifications, including analyses and specifications for lead and glycidol, demonstrate consistency of production. During the esterification process, the glycidol is apparently totally reacted (or reduced to non-detectable levels) since glycidol residues were not detected in Process B-derived PGFAs (analytical sensitivity of 1.7 ppm). A risk assessment for potential glycidol residues is presented below. The specifications for Taiyo-Kagaku PGFAs are consistent with those in the current edition of the Food Chemicals Codex (FCC). FCC V at 343.

EXPOSURE

Keller & Heckman, in the GRAS Dossier, reasonably estimated exposure to PGFAs from total production in the U.S. since the toxicological profiles of each member of the PGFA family are similar. The total production of PGFAs sold in the U.S. in 1987 was estimated at 263,000 pounds. Taiyo-Kagaku assumes that poundage and the population have both increased proportionally since 1987, keeping the per capita consumption the same. This is equivalent to [263,300 pounds/year]÷[231 million persons] $= 1.14 \times 10^{-3}$ pounds/person/yr or 0.517g/p/yr or 517 mg/p/yr or [517 mg/p/yr] ÷[365 days/yr] = 1.42 mg/p/day. To approximate the 90th percentile this amount is attributed to 10 % of the population the estimated consumption is 14.2 mg/person/day or 0.2 mg/kg bw/day for a 70 kg person. Combining the food additive and dietary supplement uses and conservatively neglecting any substitutional reduction in exposure, the total maximum estimated daily intake of PGFAs from Process B-derived polyglycerols is 150 mg/p/d + 14.2 mg/p/d = 165 mg/p/day.

SAFETY ASSESSMENT

The safety of PGFAs has been reviewed by JECFA and an ADI of 25 mg/kg bw established in 1973. This evaluation was based on the chronic toxicity of polyglycerols (PGs) and other polymeric components of the PGFAs since the other major metabolites, glycerol and fatty acids, are considered safe at significantly higher doses. This conclusion was reaffirmed by the European Food Safety Authority's Scientific Committee (1978). There is no specific FDA food additive clearance for diglycerol or any more highly polymerized PG but the safety of PGs as a group may be inferred from evaluations of PGPR (the PG ester of ricinoleic acid) and other PGFAs in the context of FDA evaluations for food additive clearance and in GRAS Notifications (GRASN No. 9 and GRASN No. 179 and 21 C.F.R. § 172.854). The Panel did not review the information evaluated by JECFA or EFSA but accepted their evaluation since expert committees conducted the evaluations. The PGFAs evaluated by JECFA and EFSA were not produced using highly polymerized PG, e.g., PG 30 or PG 40. The results of existing studies on less polymerized PGFAs suggest that increasing the degree of polymerization should not have an adverse effect on the safety of PG or the PGFAs made from it, as the extent of absorption tends to decrease with the higher polymers.

The safety assessment is appropriately based primarily on the existing lifetime studies with PGFA, and the nature of the metabolic products. No evidence of cancer was found in these studies. Moreover, there are no alerting functional groups in the PGFA molecule that suggest potential mutagenicity, or reproductive or developmental effects.

The acute oral LD_{50} for the polyglycerols (PG≤ 3) in both rats and rabbits is greater than 27-31 g/kg bw.

ABSORPTION, DISTRIBUTION, METABOLISM, EXCRETION

PGFAs produced from PG 3 through PG 10 are hydrolyzed to their PG backbones and fatty acids The metabolic studies of Babayan *et al.* (1964) and Michael and Coots (1971) demonstrated that within the range of PG 3 - PG 10, the fatty acid moiety of the PGFAs is metabolized and utilized as well as those of natural fats while the PG ether moieties, while absorbed, are inert to normal enzymatic hydrolysis. It has also been shown by Michael and Coots (1971) that as the molecular weight of the PG moiety increases, the rate of absorption decreases. It may be inferred that the same will hold true with the higher PGs, e.g., PG 11 - PG 40, with even less absorption of the intact PG moieties due to their much larger molecular weight.

GLYCIDOL

Glycidol is used in the manufacture of Process B-derived PGFAs and none has been detected in the finished PGs (limit of detection: 1.7 ppm). However, to provide additional assurance of safety, a risk assessment for glycidol using the worst-case scenario (glycidol would be present at one half the limit of detection, 0.9 ppm) was conducted (DiNovi, 1994). The risk is less than 1 X 10^{-6} regardless of which method is used, the extrapolation method of the USFDA, or methods used by the USEPA or EFSA.

The risk assessment is presented in detail in Appendix 3 of the GRAS Dossier.

SUMMARY/BASIS FOR GRAS DETERMINATION

The safety of PGFAs made from Process B-derived PGs for use in food has been established based on the USFDA's regulations for PG esters of fatty acids (21 C.F.R. § 172.854) and the published safety evaluations conducted by JECFA and EFSA. The Process B-derived PGs are GRAS based on scientific procedures since all the critical safety data have been published. Safety is also supported by a history of safe use of PGs.

CONCLUSION

We, the Expert Panel, have independently and collectively critically evaluated the data and GRAS Dossier on PGFAs prepared by Dr. Robert Scheuplein of Keller and Heckman, and other materials deemed necessary or appropriate, and unanimously conclude that Process B-derived PGFAs, meeting the specifications described herein, and produced and used consistent with current Good Manufacturing Practice are safe and Generally Recognized As Safe (GRAS) by scientific procedures for use as emulsifiers in food at levels necessary to achieve their technical effect, including use to inhibit clouding in vegetable and salad oils, and use in DAG oil (at levels of 0.05-0.2%). The Expert Panel further believes that other qualified experts would concur with this conclusion.

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Appendix 2

Appendix 2

"Analysis of Residual Glycidol in Glycidol-derived Polyglycerin", Daicel Chemical Industries, Inc.

CONFIDENTIAL DOCUMENT

Appendix 3

Appendix 3

Quantitative Risk Assessment for Glycidol

Quantitative Risk Assessment for Glycidol

The type of risk assessment considered appropriate for a substance depends on the accompanying data relating to the probable mechanism or mode of action of the substance in producing the tumors. Glycidol was mutagenic in a variety of *in vitro* and *in vivo* short-term tests. Glycidol was positive in five bacterial strains of *S. typhimurium* in the Ames test with and without exogenous metabolic activation. Glycidol was positive without exogenous activation in the mouse lymphoma assay. In cytogenetic tests with Chinese Hamster ovary cells, glycidol induced both sister chromatid exchanges and chromosomal aberrations with and without exogenous metabolic activation. This positive mutagenicity and the absence of any other mechanistic information indicating a possible threshold in the dose-response virtually dictates the use of non-threshold extrapolation models for agencies that rely on mathematical models (such as FDA and the Environmental Protection Agency (EPA)), and conservatism for agencies (such as the European Food Safety Authority (EFSA)) that eschew mathematical models in favor of margin of exposure (MOE) methods.

As discussed in Section IV.D.2 in the body of the GRAS notification, carcinogenicity studies of glycidol were conducted by the National Toxicology Program (NTP) and the final NTP Technical Report TR 374 was published in March 1990. NTP Technical Report Toxicology and Carcinogenesis Studies of Glycidol in F344/N Rats and B6C3F1 Mice (Gavage studies) NTP TR 374. Under the conditions of the two-year gavage studies there was *clear evidence of carcinogenic activity* in both rats and mice of both sexes. Multiple organ sites were affected in both mice and rats. These included increased incidences of mesotheliomas of the tunica vaginalis, fibroadenomas of the mammary gland, gliomas of the brain, and neoplasms of the forestomach, intestine, skin, Zymbal gland and thyroid gland in F344/N rats; and increased incidences of neoplasms of the Harderian gland, forestomach, skin, subcutaneous tissue, liver, lung, mammary gland and uterus in B6c3F1 mice.

We reviewed the Analysis of Primary Tumor Tables in the NTP bioassays of the rat and mouse and selected for risk assessment those tumor types that gave the highest risk (lowest dose for a given risk). These tumors in male rats were mesotheliomas of the tunica vaginalis (mesothelium of the abdominal cavity) In female rats the most prevalent tumors were fibroadenomas or adenocarcinomas of the mammary gland. The most prevalent tumors in male mice were hepatocellular adenomas or carcinoma. In female mice the most prevalent tumors were found in the Harderian gland.

Linear—Simple Algorithm

There are several ways to estimate the cancer risk from a standard animal bioassay using non-threshold models. The simplest is to linearly extrapolate to the origin from the lowest dose in the bioassay that gives a significant response and identify (from the extrapolated line) the dose that corresponds to an insignificant risk (usually 10^{-6}). This is equivalent to saying that the Risk = slope of the line (P) × dose (D); or Risk = P x D. For the mesotheliomas in male rats the incidence at the low dose of 37.5 mg/kg bw/day is 48%. Subtracting the background rate of 6% gives a net incidence of 42% or a net risk of 0.42. The corresponding dose (D) is therefore

0.42/37.5 = 0.0112 [mg/kg bw/day]$^{-1}$. Using this slope and the equation: Risk = P x D, we calculate the dose corresponding to a risk of 1.0 x 10^{-6}: D = Risk / P = [1.0 x 10^{-6}]/0.0112 = **8.93 x 10^{-5} mg/kg bw/day.** For a 70 kg individual this dose is equivalent to an intake of 8.93 x 10^{-5} mg/kg bw/day x 70 kg bw/day = **6.25 microgram** (μg)/person per day. If the daily diet contained this amount uniformly distributed in 1.5 kg, the figure FDA uses for the solid food portion of the daily diet,[1] the concentration in the diet would be **6.25 μg/1.5 kg = 4.17** parts per billion (ppb).

Mathematical Models

Both EPA and FDA use mathematical extrapolation models to estimate the human cancer risk from low-dose exposures based on the high-dose experimental exposures to animals. These models fit the data to mathematical functions that may better model the actual dose-response than a straight line. We used EPA's Benchmark Software Version 1.3.2 to calculate the cancer risks for glycidol. This software includes the multistage model, which at low doses is virtually identical to the linear model used by FDA, but permits curvature at higher doses. We used the multistage model to compute benchmark doses (BMDs). The BMD is the best estimate of the dose for a given incidence using the given model to fit the curve within the experimental range. The BMDL is the lower 95% confidence limit on that dose. We also used the EPA software to compute the doses corresponding to other risks including the one-in-a-million, or 10^{-6}, risk. The one-in-a-million risk is considered to be insignificant or *de minimis* by FDA for most carcinogens.

The figure below shows the multistage plot for the mesotheliomas in male rats. The position of the benchmark dose (BMD_{10}), 4.594 mg/kg bw/day, is shown along with its $BMDL_{10}$ of 3.689 mg/kg bw/day based on a 95% confidence limit. Table 2 gives the calculated BMDs and BMDLs for the risks from 0.25 to 10^{-6} in 10-fold increments. Each entry in Table 2 and Table 3 is the result of a separate calculation using the benchmark software.

---

[1] For purposes of estimating intake, FDA assumes that the daily diet is 3 kg, split evenly between liquid and solid food. Although some of the intended uses of the Process B polyglycerols and PGFAs will be in solid foods and some will be in liquid foods, we are using the 1.5 kg figure, rather than the 3 kg total daily diet figure, to estimate exposure because doing so (1) is arguably closer to the actual portion of the daily diet reflected in the intended uses and (2) builds additional conservatism into our intake estimate.

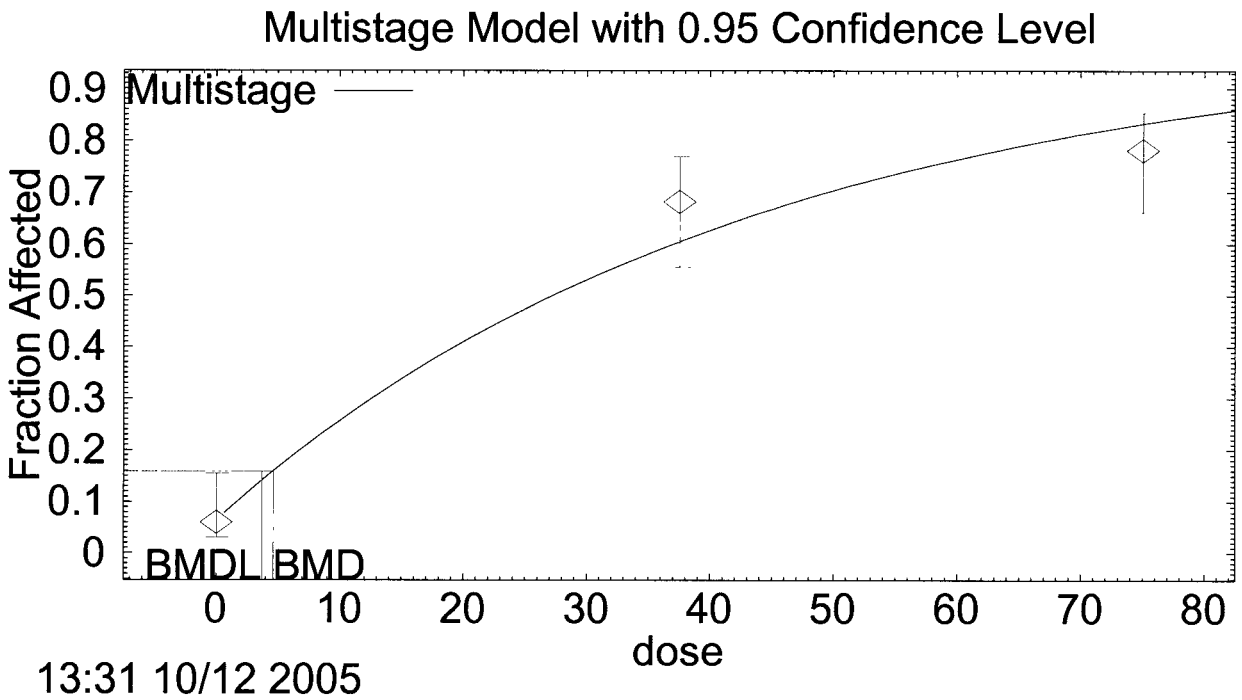

Table 2
Calculated BMD and BMDL Values for Tumors Produced in Rats by Glycidol

Risk	BMD Mesotheliomas	BMDL Mesotheliomas	BMD Mammary gland	BMDL Mammary gland
	Males		Females	
0.25	12.54	10.07	18.24	13.38
0.10	4.594	3.689	6.682	4.900
0.01	0.4382	0.3519	0.6374	0.4674
0.001	0.0436	0.0350	0.0634	0.0465
0.0001	0.0044	0.0035	0.0063	0.00465
0.00001	0.00044	0.00035	0.00063	0.000465
10^{-6}	4.4×10^{-5}	**3.5×10^{-5}**	6.3×10^{-5}	4.65×10^{-5}

Dose units are mg/kg bw/day. The multistage model was used for extrapolation. Most models with a linear term will give the same result at low doses.

Table 3 gives the corresponding results for liver tumors in male mice and Harderian gland tumors in female mice.

Table 3 Calculated BMD and BMDL Values for Tumors Produced in Mice by Glycidol				
Risk	**BMD Liver**	**BMDL Liver**	**BMD Harderian gland**	**BMDL Harderian gland**
	Males		**Females**	
0.25	25.61	14.64	32.58	22.43
0.10	9.381	5.361	11.93	8.214
0.01	0.8948	0.5114	1.138	0.784
0.001	0.0891	0.0509	0.1133	0.0780
0.0001	0.0089	0.0051	0.0113	0.0078
0.00001	0.00089	0.00072	0.00113	0.00113
10^{-6}	8.90×10^{-5}	**7.02×10^{-5}**	1.13×10^{-4}	1.13×10^{-4}
Dose units are mg/kg bw/day. The multistage model was used for extrapolation, but most models with a linear term will give the same result at low doses.				

The multistage risk model (with a 95% confidence level) gives somewhat higher risks (~ 2.55-fold higher) than the simple linear extrapolation; and the virtually safe dose (corresponding to a 10^{-6} risk) is accordingly lower: **3.5×10^{-5}** mg/kg bw/day *vs* **8.93×10^{-5}** mg/kg bw/day. The level of 3.5×10^{-5} mg/kg bw/day corresponds to a human intake of **2.45 µg/day** and to a dietary concentration of **1.63 ppb.**

EFSA Approach

In April of 2005, EFSA's Scientific Committee published a "Draft Opinion on a Harmonized Approach for Risk Assessment of Compounds which are both Genotoxic and Carcinogenic."[2] The ESFA Committee recommends a margin of exposure approach (MOE). Their method consists of locating the $BMDL_{10}$ and then using an overall safety factor of 10,000 to determine a safe dose level. For the mesotheliomas in male rats the $BMDL_{10}$ is 3.69 mg/kg bw/day. If this is divided by a factor of 10,000, the safe level is **3.69×10^{-4} mg/kg/bw or 22.1 µg/p/day.** This safe level is approximately 10 times larger than the 10^{-6} risk calculated by the mathematical models used by FDA or EPA.

Risk of Glycidol Impurity Levels in Product

The impurity analysis conducted for Taiyo-Kagaku on Process B polyglycerol found no detectable levels of glycidol with a detection limit of 20 ppb.[3] It is FDA policy to estimate that

---

[2] EFSA Scientific Committee (2005) No. EFSA-Q-2004-020.

[3] The analysis of glycidol residues is found in an Analysis Report entitled "Analysis of Residual Glycidol in Glycidol-derived Polyglycerin". (Confidential Report from Daicel

(continued ...)

the average level of contamination is one-half the detection limit, which in this case would be 10 ppb. We shall assume that 10 ppb will be the average level of glycidol in polyglycerols synthesized by Process B and derivatives of the polyglycerols (i.e., PGFAs). For the sake of conservatism, we are assuming the same level of glycidol residues in PGFAs made from polyglycerols produced by Process B as in the polyglycerols themselves.

The important question relevant to potential human risk is: what is the estimated likely average daily intake of polyglycerols or their derivatives made by the glycidol process? We have shown above that an intake of 2.45 μg glycidol /day is equivalent to a theoretical, lifetime cancer risk of one in a million (or a 10^{-6} risk). Since the risk is proportional to the dose, the cancer risk corresponding to any amount of glycidol can be calculated from the ratio of the estimated daily intake of glycidol in μg/day to the daily intake (= 2.45 μg/day) corresponding to a 10^{-6} risk:

Risk = 10^{-6} × (glycidol intake in /2.45 μg/day)

For example: corresponding to a daily intake of a gram of polyglycerol, the theoretical lifetime cancer risk would be: $(10^{-6}) \times (1.0 \text{ g/day} \times 0.01 \ \mu\text{g/g})/2.45 \ \mu\text{g/day}) = 4.76 \times 10^{-9}$. This concentration of glycidol is so low that it does not affect the safety evaluation. Even if the use level of the PGFAs is at the 1.75 g/p/d ADI, the risk would be far below 10^{-6}:

Risk = $(10^{-6}) \times (1.75 \text{ g/day} \times 0.01 \ \mu\text{g/g} /(2.45 \ \mu\text{g/day}) = (10^{-6}) \times (0.0175/2.45) = 8.3 \times 10^{-9}$.

Thus there is no significant risk from the trace levels of glycidol in the final product.

Anticipated use levels of the polyglycerols

As explained in detail in Section III.A of the GRN, combining all intended conventional food additive and iron/zinc supplement uses, an upper bound on the total maximum estimated intake of PGFAs from all of Taiyo-Kagaku's intended uses of Process B-derived polyglycerols is 195 mg/p/day. From Table 4, above, it is apparent that if EPA or FDA risk assessment procedures are used, glycidol intake resulting from the theoretical presence of 10 ppb glycidol in 195 mg/person/day polyglycerols or PGFAs from of Process B-derived polyglycerols would be insignificant. The estimated risk would be: Risk = $(10^{-6} \times (0.00195 \ \mu\text{g})/2.45 \ \mu\text{g/day}) = 8 \times 10^{-10}$. If the EFSA risk assessment is used, substantially higher intakes of polyglycerols or PGFAs containing 10 ppb glycidol would be acceptable.

Chemical Industries, Ltd.) August 31, 2007. *See* Appendix 2. This report discusses the results of a LS/MS/MS analysis of two lots of polyglycerol produced by Process B. No glycidol was found at a detection limit of 20 ppb in polyglycerol samples with 10- or 40-degrees of polymerization.

Conclusion

It is evident from the NTP studies that glycidol is a mutagenic, rodent carcinogen. Based on the current impurity levels of glycidol in the Process B production process and the estimates of maximum potential PGFA ingestion, the average measured glycidol levels are far below significant risk levels. Specifically, if 195 mg/day amount polyglycerols or their esters containing an average 10 ppb level of glycidol impurity are ingested daily, the estimated lifetime cancer risk will not exceed 8×10^{-10}.

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November 21, 2008

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BY:----------

Via Overnight Delivery

Dr. Robert L. Martin
Supervisor, Consumer Safety OFC
Food and Drug Administration
Center for Food Safety and Applied Nutrition
Office of Food Additive Safety, HFS-255
5100 Paint Branch Parkway, Room 2045
College Park, Maryland 20740

Re: Taiyo Kagaku's October 10, 2008 GRAS Submission

Dear Dr. Martin:

Enclosed is a non-confidential copy of the Analytical Report contained in Appendix 2 of Taiyo Kagaku's GRAS notification, sent to you on October 10, 2008, for polyglycerol esters of fatty acids up to and including P 40 glycerol esters made from glycerol and glycidol as emulsifiers and cloud inhibitors. Please use the enclosed non-confidential Analytical Report to replace the copy that was marked confidential in Appendix 2.

Sincerely,

John F. Foley

Enclosures

cc: Moraima Ramos-Valle (via facsimile)
Kaz Kuroki, Taiyo International, Inc.

RECEIVED
NOV 25 2008
BY:

Analysis Report

Analysis of Residual Glycidol in Glycidol-derived Polyglycerin

Report prepared by:
Research & Development Center,
Organic Chemical Products Company,
Daicel Chemical Industries, Ltd.

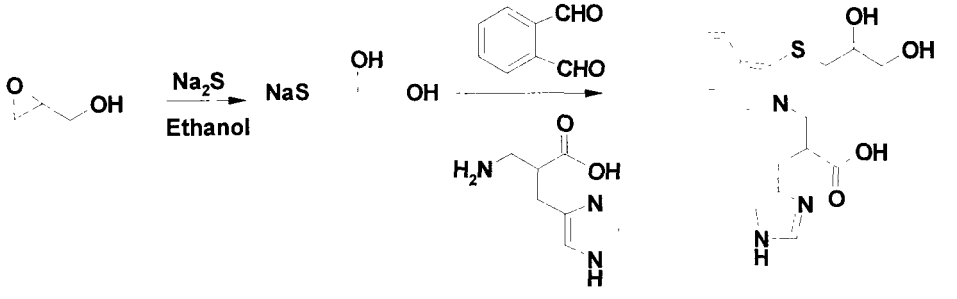
Report No. : 2007-0002 Date of report : August 31, 2007

Samples
1) Process B-polyglycerin(degree of polymerization: 10)
2) Process B-polyglycerin (degree of polymerization: 40)

Process B: ring-opening polymerization with glycidol

2. Apparatus
Detector : Micromass Quattro Ultima Pt tandem-quadrupole LC/MS/MS system (makes of Waters Corporation)
HPLC : Agilent HP1100 HPLC system (makes of Agilent Technologies, Inc.)

3. Method
Following the selective derivatization reaction scheme for glycidol, as shown below, sample was pretreated before LC/MS/MS analysis was conducted for identifying the glycidol-derived peak component.



Scheme 1

4. Conclusion
By using the prederivatization-LC/MS/MS analysis method, which allows the analysis of lower determination limit at 60ppb and lower detection limit at 20ppb with the conversion value of glycidol concentration in the sample of polyglycerine, three lots each of sample of Process B-polyglycerin (degree of polymerization : 10) and Process B-polyglycerin (degree of polymerization : 40), respectively, were analyzed. As a result of the said analysis, presence of glycidol was not identified.

5. Analytical peocesses and the result
5-1 Preparation of sample solution
i) 1g of each polyglycerin sample was weighed and placed in a 20mL sample vial, and 9g of ethanol was added to each vial, then heated gently with a dryer for complete dissolution of polyglycerin within 3 minutes before subjecting them to the prederivatization processes.

ii) For preparing the standard glycidol sample solution, 1 mg of glycidol was weighed and ethanol was added to the said glycidol to prepare sample solution with 1000ppm concentration. Thereafter, the sample solution was diluted with ethanol to prepare the standard solution with the targeted concentration for subjecting the said standard solution to the prederivatization processes.

5-2. Prederivatization of glycidol

i) 100uL of ethanol solution, as sample, was placed in a 3.5mL vial with screw cap.
ii) Then, 20uL of 30mM Na_2S aqueous solution was added to the above-mentioned solution.
iii) Vial was heated in the heating block for 20 minutes at 55°C.
iv) Vial was cooled down to room temperature.
v) 400uL of 0.6mM Histidine solution*1 was added.
vi) 400uL of 0.3mM o-Phthalaldehyde solution*2 was added.
vii) Vial was shaken for 20 seconds.
viii) Resulting solution was passed through 0.2um filter, and afterwards, stored in an ice-bath until LC/MS/MS analysis was conducted.
ix) The filtrate was subjected to LC/MS/MS analysis, and the peak corresponding to the glycidol derivative was monitored.

*1 : Histidine solution was prepared by dissolving Histidine in 50mM tetraborate buffer solution(pH 8.3) so that the concentration was adjusted to 0.6mM.
*2 : 6mM solution of o-Phthalaldehyde in 10% Methanol aqueous solution was diluted with 50mM tetraborate buffer(pH 8.3), so that the concentration was adjusted to 0.3mM.

5-3. LC/MS/MS analysis condition

<HPLC condition>

Column	: TSKgel ODS-100Z(Φ2.1mm x 150mmL)
Column temperature	: 40℃
Eluent	: (A) 0.1% Formic acid (B) Acetonitrile
Gradient condition	: A/B=95/5(0min) -> 15min -> 0/100(5min)
Flow rate	: 0.2ml/min
Injection volume	: 10uL

<MS condition>

Ion source	: ESI-pos
Measurement mode	: MRM (parent ion-m/z 362.0, daughter ion-m/z 272.0)
Capillary	: 4.0kV
Cone	: 35
RF Lens 1	: 20.0
Desolvation Temp	: 200℃
Aperture	: 0
Ion Source Temp.	: 80C
RF Lens 2	: 0.0
LM Resolution 1	: 15.0
LM Resolution 2	: 15.0
HM Resolution 1	: 15.0
HM Resolution 2	: 15.0
Ion Energy 1	: 3.0
Ion Energy 2	: 2.0

Entrance	: 1
Multiplier	: 650
Collision	: 20
Cone Gas	: 70L/hr
Exit	: 2.0
Desolvation Gas	: 600L/hr

5-4. Discussion on the lower detection limit of the prederivatization-LC/MS/MS method applied in this report

Prederivatization-LC/MS/MS elution profiles of glycidol standard solution at various concentrations are shown below, from Fig. 1 to Fig. 5.

As the glycidol concentration-peak area plot resulted in good linearity from several picograms/g to sub-micrograms/g range glycidol concentration, which is shown in Fig.6, the determination limit by the prederivatization-LC/MS/MS method was apparently less than 6ppb, and therefore, the lower detection limit of glycidol standard solution was assumed to be 2ppb, generally assumed 1/3 of the determination limit.

On the analysis of glycidol in polyglycein samples, each polyglycerin sample was subjected to the prederivatization process by 10wt% solution in ethanol, as mentioned later in the next section.

Hence, the prederivatization-LC/MS/MS method applied in this report proved to be able to analyze residual glycidol in polyglycerin with lower detection limit of less than 20ppb, and with determination limit of less than 60ppb.

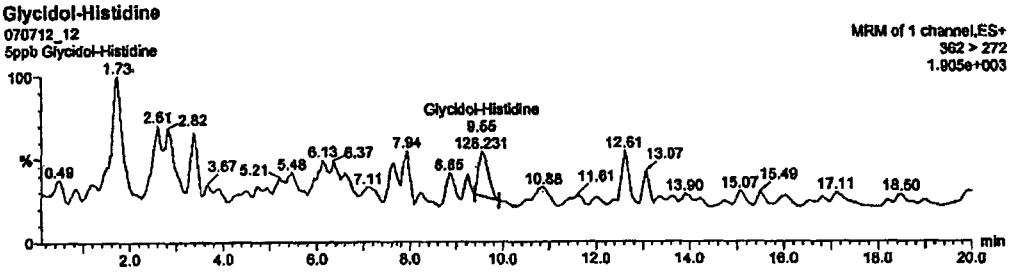


Fig. 1 Prederivatization-LC/MS/MS elution profile of glycidol 6ug/kg standard sample

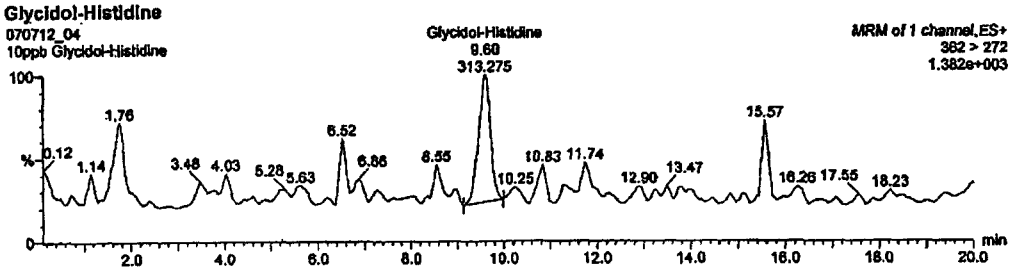


Fig. 2 Prederivatization-LC/MS/MS elution profile of glycidol 13ug/kg standard sample

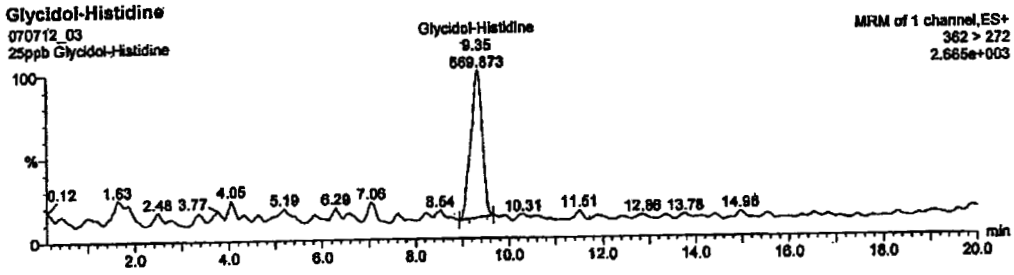


Fig. 3 Prederivatization-LC/MS/MS elution profile of glycidol 32ug/kg standard sample

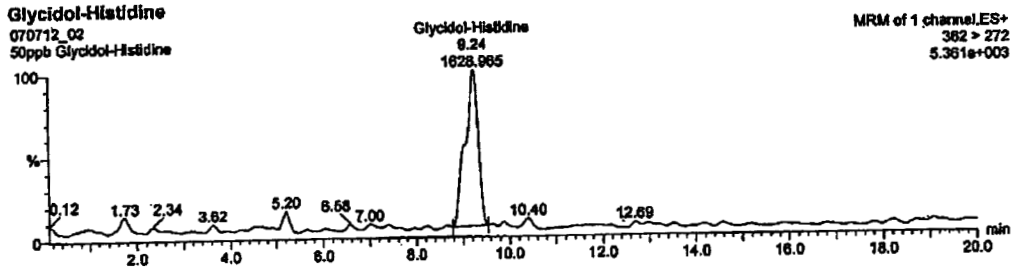


Fig. 4 Prederivatization-LC/MS/MS elution profile of glycidol 63ug/kg standard sample

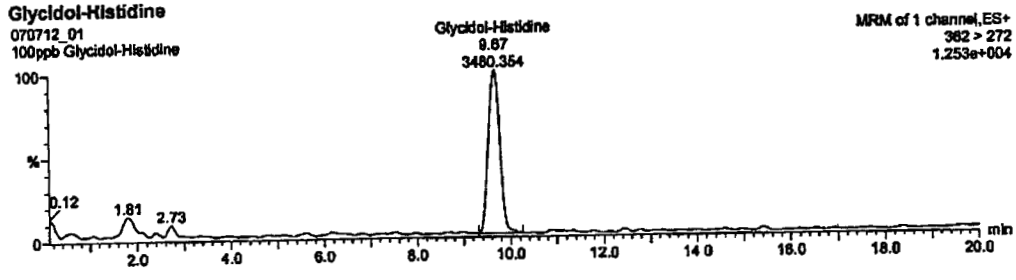


Fig. 5 Prederivatization-LC/MS/MS elution profile of glycidol 136ug/kg standard sample

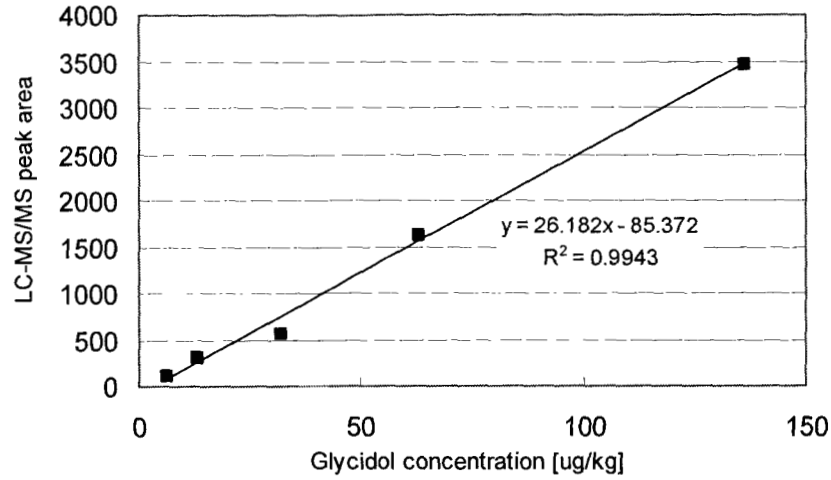


Fig. 6 Calibration plot of glycidol standard solution by prederivatization-LC/MS/MS analysis

5-5. Analysis of glycidol supposedly contained in process B-Polyglycerin

LC/MS/MS elution peak profiles of polyglycerin samples obtained by prederivatization- LC/MS/MS analysis are shown below, from Fig. 7 to Fig. 12.

Three lots each of sample of Process B-polyglycerin (degree of polymerization : 10) and Process B-polyglycerin (degree of polymerization : 40), respectively, were analyzed, and, as a result, only noise were observed, and any peak indicating the presence of derivatized glycidol was never found in all data.

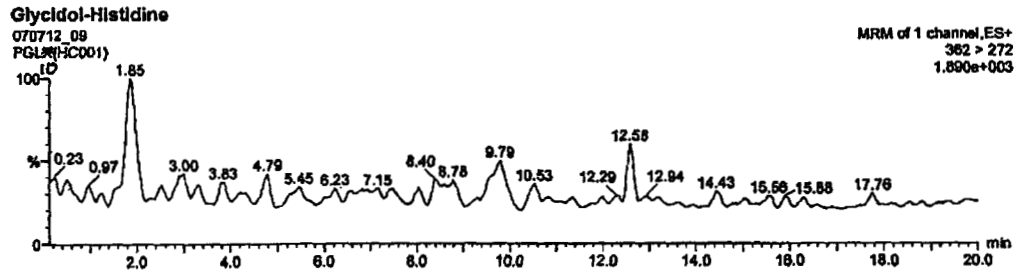


Fig. 7 Prederivatization-LC/MS/MS peak profile of process B-polyglycerin (degree of polymerization: 10, lot HC-001)

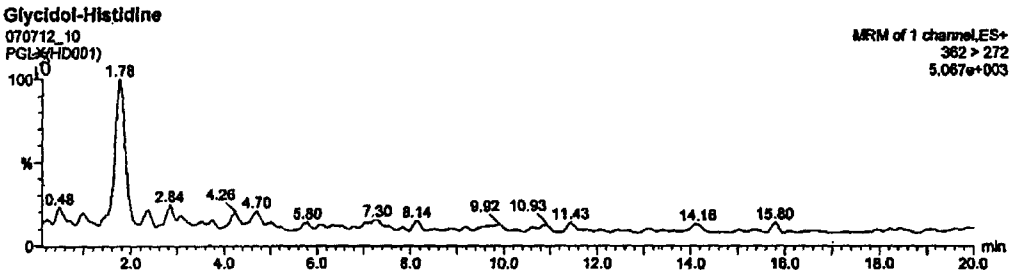


Fig. 8 Prederivatization-LC/MS/MS peak profile of process B-polyglycerin (degree of polymerization: 10, lot HD-001)

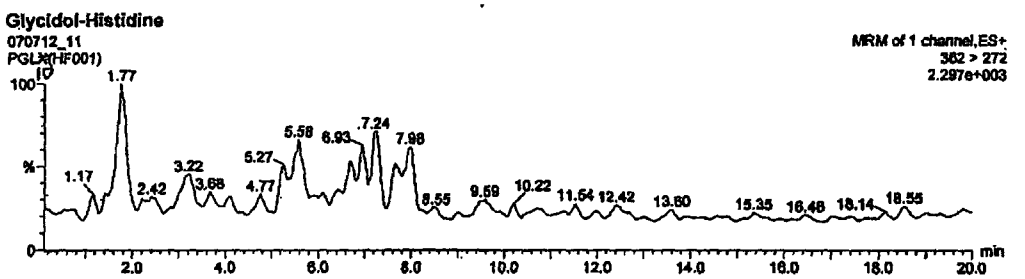


Fig. 9 Prederivatization-LC/MS/MS peak profile of process B-polyglycerin (degree of polymerization: 10, lot HF-001)

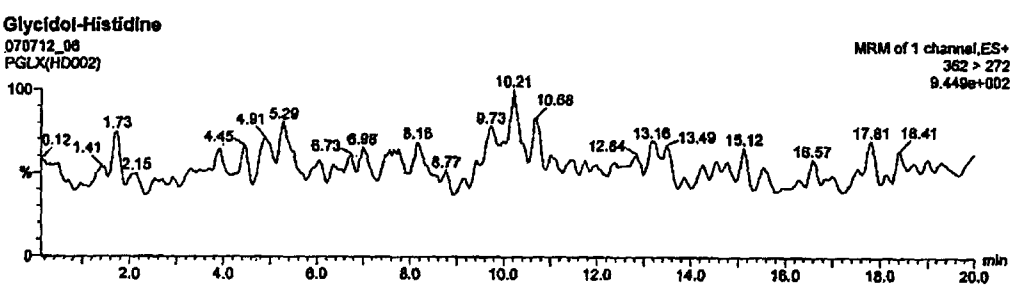


Fig. 10 Prederivatization-LC/MS/MS peak profile of process B-polyglycerin (degree of polymerization: 40, lot HD-001)

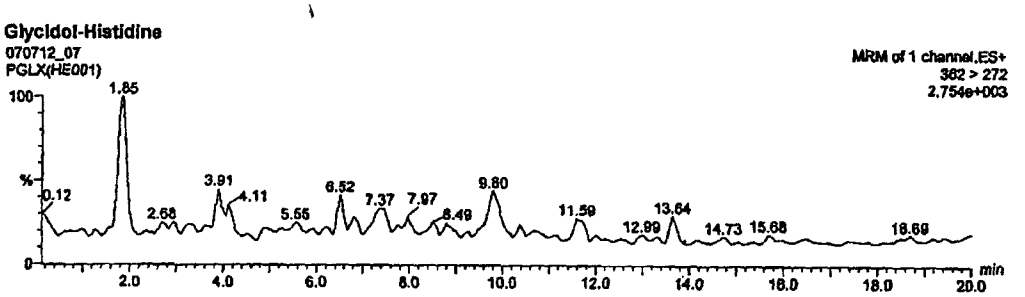


Fig. 11 Prederivatization-LC/MS/MS peak profile of process B-polyglycerin (degree of polymerization: 40, lot HE-001)

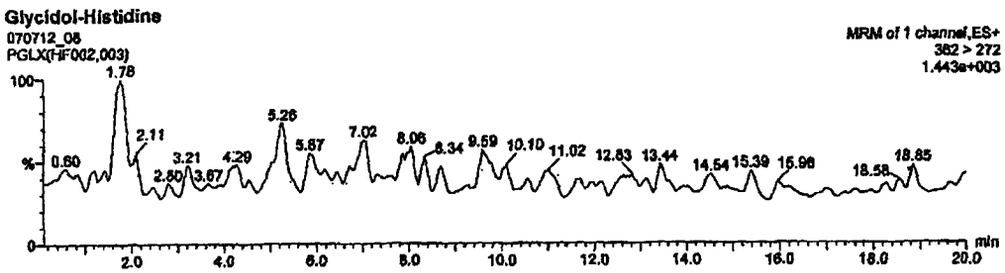


Fig. 12 Prederivatization-LC/MS/MS peak profile of process B-polyglycerin (degree of polymerization: 40, lot HF-002)

SUBMISSION END

AM

From: Foley, John
To: Mosley, Sylvester;
cc: Drozen, Melvin S.; Scheuplein, Robert J.;
Subject: GRN 000269--Response to Questions
Date: Friday, March 13, 2009 4:56:31 PM
Attachments: Supplemental Description of PG Manufacturing1.doc
Reaction rate simulation graph.pdf
Glycidol (GD) reaction spreadsheet.xls

Dear Dr. Mosley:

This email responds to your January 21, 2009 email, which requested clarification in three areas regarding GRN 269, which we submitted on behalf of our client, Taiyo Kagaku Co., Ltd. Taking them in order, your first two questions are answered below, and the third, which asked for more detail regarding the PGFA manufacturing process, is addressed in the three attached documents, designated "Supplemental Description of PG Manufacturing", "Glycidol (GD) reaction spreadsheet" and "Reaction rate simulation graph".

In your January 21 email, you noted that in "section I-B (Applicable Conditions of Use) on page 3, the notice cites 21 CFR 170.3 (n)(8) and 21 CFR 170.3 (n)(24), which are designated for food categories. Is this the correct citation or is the intent to list 21 CFR 170.3 (o)(8) and 21 CFR 170.3 (o)(24), which are designated for technical effects?" The above citation is incorrect, for which we apologize. The referenced citation on page 3 of the GRN should be to the technical effects described in 21 CFR 170.3 (o)(8) and 21 CFR 170.3 (o)(24). The same error occurs on page 5 of the notice.

You also noted in your email that in section III-A.2 (PGFA intake from supplements) on page 12, of the notice it is stated that "the combined maximum safe UL level for zinc and iron supplements combined is 40 mg (Zn) and 45 mg (iron) = 90 mg". This passage of the GRN should read "the combined maximum safe UL level for zinc and iron supplements combined is 40 mg (Zn) and 45 mg (iron) = 85 mg". While this error means that our intake estimates for PGFAs and hypothetical, worst-case levels of glycidol are somewhat off, the effect of the error was to increase slightly the conservatism of our exposure estimates. Again, we apologize for and regret any inconvenience that this error may have caused the Agency.

Finally, you asked that we provide a more detailed description of the manufacture of PGFAs by way of process B than that currently contained in the notice, including "the identification of the catalyst as well as the manner in which the glycidol is removed". A more detailed description of the manufacturing process, including names of possible catalysts and how glycidol is removed, is

provided in the attached document, designated "Supplemental Description of PG Manufacturing". The supplemental manufacturing description references two other documents that are attached: (1) a document designated "Reaction rate simulation graph", and (2) a document designated "Glycidol (GD) reaction spreadsheet", both of which illustrate how 10 g of glycidol would be predicted to turn into glycerin in 1,000 kg of water at 100 C.

We trust that you will consider the above and attached information responsive to your questions. If you require further information on this or other topics regarding GRN 269, please let us know by phone or email.

Sincerely,

Melvin S. Drozen
John Foley

John F. Foley
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-----Original Message-----
From: Mosley, Sylvester [mailto:Sylvester.Mosley@fda.hhs.gov]
Sent: Wed 1/21/2009 10:52 AM
To: Drozen, Melvin S.; Foley
Subject: GRN 000269

Dear Mr. Drozen and Mr. Foley,

During our review of GRN 000269, we have identified a few areas that require clarification. We would appreciate it if you could provide additional information on:

* In section I-B (Applicable Conditions of Use) on page 3, the notice cites 21 CFR 170.3 (n)(8) and 21 CFR 170.3 (n)(24), which are

designated for food categories. Is this the correct citation or is the intent to list 21 CFR 170.3 (o)(8) and 21 CFR 170.3 (o)(24), which are designated for technical effects?

* In section III-A.2 (PGFA intake from supplements) on page 12, it is stated that the combined maximum safe UL level for zinc and iron supplements combined is 40 mg (Zn) and 45 mg (iron) = 90 mg. For clarification, should this be 45 mg (Zn) + 45 mg (iron) = 90 mg or 40 mg (Zn) + 45 mg (iron) = 85 mg?

* In section II-B (Method of Manufacture) on page 7, PGFAs made by way of process B is not discussed in great detail. Please describe the manufacturing process in more detail, including the identification of the catalyst as well as the manner in which the glycidol is removed.

We expect that the information we have requested is readily available to you and should not require substantial data collection and preparation. If you have any questions about our request, or believe you will not be able to respond within approximately two weeks, please do not hesitate to contact me.

Sincerely,

Sylvester L. Mosley, Ph.D.
Consumer Safety Officer
Office of Food Additive Safety-CFSAN
U.S. Food and Drug Administration
5100 Paint Branch Parkway (HFS-255)
College Park, MD 20740-3835
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Email: Sylvester.Mosley@fda.hhs.gov

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Supplemental description of PG manufacturing for Taiyo GRN (March 13, 2009):

Method of Manufacture

Process B PGs are made using glycerol and glycidol as starting materials. All materials except glycidol used in the manufacturing of Process B-derived PGFAs are food grade. The desired PG is obtained from ring-opening polymerization with glycidol. During this reaction, glycidol is heated with a catalyst to speed up the reaction of the glycerol and glycidol. Acetic acid, phosphoric acid or activated carbon is used as the catalyst. The glycidol then reacts with a second molecule, losing water and yielding the diglycerol, which then reacts to give a triglycerol and so on. Taiyo-Kagaku uses Process B to make various PGs with different degrees of polymerization ranging up to PG 40. These PGs are reacted with one of the following: stearic acid, palmitic acid, oleic acid or coconut fatty acid. With the exception of palmitic acid, all of the above fatty acids are listed in Section 172.854, the food additive regulation for PGFAs. The reasoning for considering palmitic acid also to be safe for the intended use is discussed in Section V of the GRN 269.

The reaction of glycerol and glycidol is designed to use up all the starting glycidol. However, to ensure thorough removal of any unreacted glycidol, after the glycidol is reacted with glycerol, water is added to the reacted liquid. By adding water, ring-opening occurs and any remaining glycidol becomes glycerin,[1] whose safety is evidenced by its listing as a multiple purpose GRAS food ingredient under 21 CFR 182.1320 with no limitation other than good manufacturing practice.

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[1] In the presence of water, glycidol is predicted to turn into glycerin according to the following reaction speed formula:

$$r = 3.50 \times 10^3 (-10114/RT) \times [\text{glycidol}] \times [H_2O] \rightarrow (1) \; [\text{kmol/m}^3\text{/hr}]$$

Based on the above formula, the attached simulation graph (attachment designated "Reaction rate simulation") is provided to illustrate how 10 g of glycidol would be expected to turn into glycerin in 1,000 kg of water at 100 C. The attached spreadsheet (designated "Glycidol (GD) reaction spreadsheet") provides a minute by minute chart of the glycidol + water → glycerin reaction based on the above speed formula.

After water treatment to remove glycidol, the PG material made by process B contains approximately 10% water. Based on the chemical properties of water and glycidol, the presence of this concentration of residual water in the PG precludes the presence of measurable levels of glycidol.[2] Actual analysis of samples of Taiyo's PG made by process B (degree of polymerization of PG samples was either 10 or 40) performed by Daicel confirms that there is no detectable glycidol (detection limit 20 parts per billion) in the PG, regardless of the degree of polymerization of the PG. See August 31, 2007 analytical report prepared for Taiyo-Kagaku by Daicel Chemical Industries, Inc., "Analysis of Residual Glycidol in Glycidol-derived Polyglycerin", a copy of which is included in Appendix 2 to GRN 269. The results of the report are also discussed in section II.C.1.ii ("impurities"), pp. 8-9 and footnote 6, of GRN 269.

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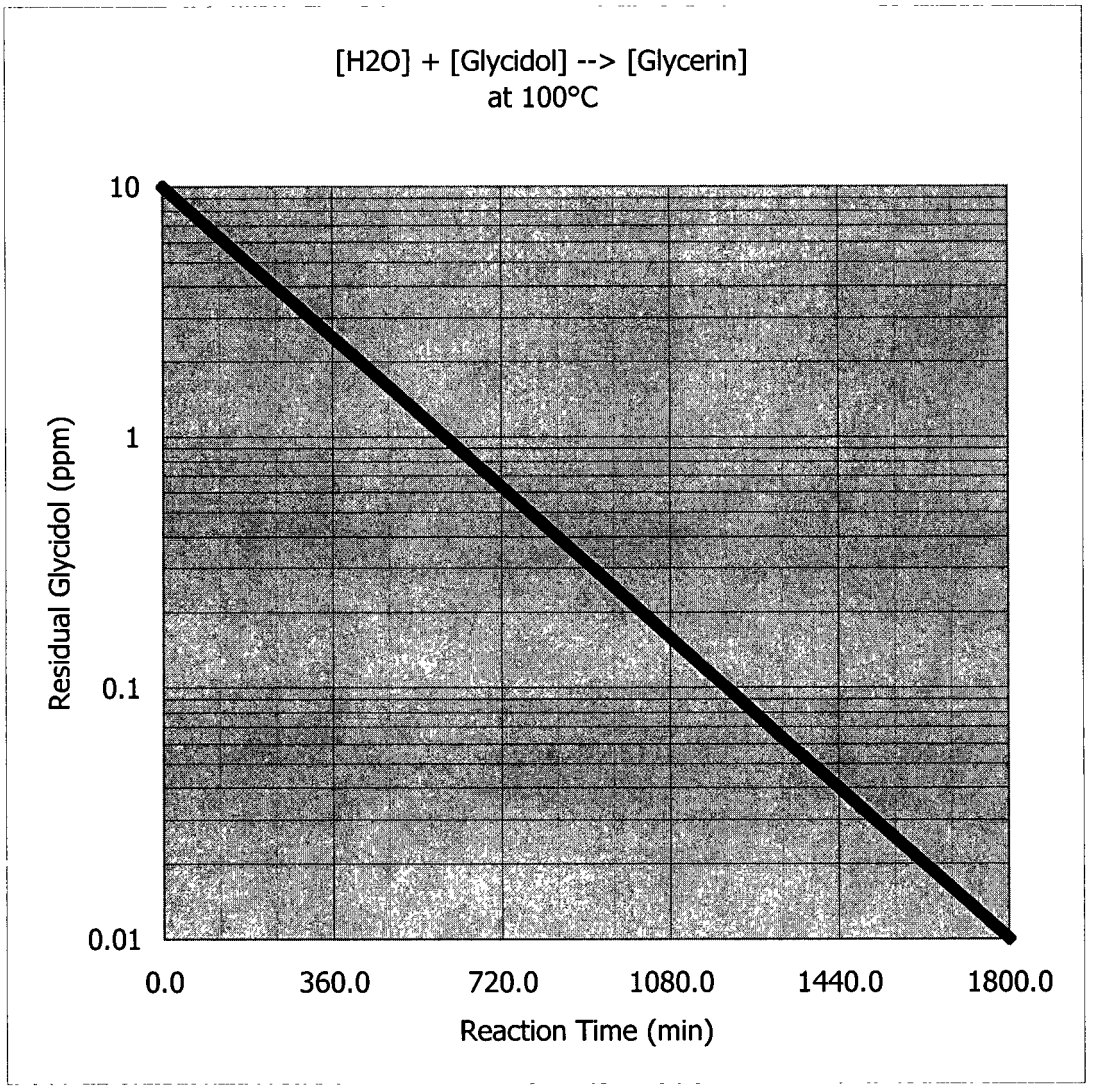
[2] The residual water is removed by dehydration prior to use of the PG to manufacture PGFE.


[H2O] + [Glycidol] --> [Glycerin]
at 100°C
10
1
0.1
0.01
Residual Glycidol (ppm)
0.0
360.0
720.0
1080.0
1440.0
1800.0
Reaction Time (min)

GD+H2O-->GL

Reaction speed formula $r4=3.50\times10^{3}\ \mathrm{Exp}(-10114/RT)\,[GD]\,[H_2O]$ (kmol/m3/h)

Parameter			Unit
	GD(Mw)	74.0785	g/mol
	H2O(Mw)	18.0153	g/mol
Pre-exponential factor	A (experimental value)	3500	
Activation energy	Ea (experimental value)	10114	cal/mol
Gas constant	R	8.31447	J K-1 mol-1
	cal	4.1868	J
	T(°C)	100	°C
	T(K)	373.15	K
initial amount of reactants	GD	0.01	kg
	GD	0.134991934	mol
	H2O	1000	kg
	H2O	55508.37344	mol
	1Hr	60	min
	1m3	1000	L

Time (min)	GD Conc. [mol/L]	H_20 Conc. [mol/L]	Reacting rate [mol/L·H]	Reacting rate [mol/L·min]	Residual GD Kg/m3	Reacting rate kg/m3·min	Reacted amount [Kg/m3] accumulated total	GD Conc. (ppm)
0.0	0.000134992	55.50837344			0.01			10
1.0	0.000134992	55.50837344	3.0991E-05	5.16517E-07	0.009961737	3.82628E-05	3.82628E-05	9.961737204
2.0	0.000134475	55.50837292	3.08724E-05	5.14541E-07	0.009923621	3.81164E-05	7.63792E-05	9.923620812
3.0	0.000133961	55.50837241	3.07543E-05	5.12572E-07	0.00988565	3.79705E-05	0.00011435	9.885650265
4.0	0.000133448	55.50837189	3.06366E-05	5.10611E-07	0.009847825	3.78253E-05	0.000152175	9.847825004
5.0	0.000132938	55.50837138	3.05194E-05	5.08657E-07	0.009810144	3.76805E-05	0.000189856	9.810144473
6.0	0.000132429	55.50837088	3.04026E-05	5.06711E-07	0.009772608	3.75364E-05	0.000227392	9.772608119
7.0	0.000131922	55.50837037	3.02863E-05	5.04772E-07	0.009735215	3.73927E-05	0.000264785	9.73521539
8.0	0.000131418	55.50836986	3.01704E-05	5.0284E-07	0.009697966	3.72497E-05	0.000302034	9.697965737
9.0	0.000130915	55.50836936	3.0055E-05	5.00916E-07	0.009660859	3.71071E-05	0.000339141	9.660858611
10.0	0.000130414	55.50836886	2.994E-05	4.99E-07	0.009623893	3.69651E-05	0.000376107	9.623893468
11.0	0.000129915	55.50836836	2.98254E-05	4.9709E-07	0.00958707	3.68237E-05	0.00041293	9.587069764
12.0	0.000129418	55.50836786	2.97113E-05	4.95188E-07	0.009550387	3.66828E-05	0.000449613	9.550386958
13.0	0.000128923	55.50836737	2.95976E-05	4.93294E-07	0.009513845	3.65424E-05	0.000486155	9.513844511
14.0	0.000128429	55.50836688	2.94844E-05	4.91406E-07	0.009477442	3.64026E-05	0.000522558	9.477441886
15.0	0.000127938	55.50836638	2.93715E-05	4.89526E-07	0.009441179	3.62633E-05	0.000558821	9.441178548
16.0	0.000127448	55.50836589	2.92592E-05	4.87653E-07	0.009405054	3.61246E-05	0.000594946	9.405053964
17.0	0.000126961	55.50836541	2.91472E-05	4.85787E-07	0.009369068	3.59864E-05	0.000630932	9.369067603
18.0	0.000126475	55.50836492	2.90357E-05	4.83928E-07	0.009333219	3.58487E-05	0.000666781	9.333218936
19.0	0.000125991	55.50836444	2.89246E-05	4.82076E-07	0.009297507	3.57115E-05	0.000702493	9.297507437

Residual Glycidol (ppm)

20.0	0.000125509	55.50836396	2.88139E-05	4.80232E-07	0.009261933	3.55749E-05	0.000738067	9.261932579	
21.0	0.000125029	55.50836347	2.87037E-05	4.78394E-07	0.009226494	3.54387E-05	0.000773506	9.226493842	
22.0	0.00012455	55.508363	2.85938E-05	4.76564E-07	0.009191191	3.53031E-05	0.000808809	9.191190703	
23.0	0.000124074	55.50836252	2.84844E-05	4.7474E-07	0.009156023	3.51681E-05	0.000843977	9.156022645	
24.0	0.000123599	55.50836205	2.83754E-05	4.72924E-07	0.009120989	3.50335E-05	0.000879011	9.120989149	
25.0	0.000123126	55.50836157	2.82669E-05	4.71114E-07	0.00908609	3.48994E-05	0.00091391	9.086089702	
26.0	0.000122655	55.5083611	2.81587E-05	4.69312E-07	0.009051324	3.47659E-05	0.000948676	9.05132379	
27.0	0.000122186	55.50836063	2.8051E-05	4.67516E-07	0.009016691	3.46329E-05	0.000983309	9.016690902	
28.0	0.000121718	55.50836016	2.79436E-05	4.65727E-07	0.008982191	3.45004E-05	0.001017809	8.98219053	
29.0	0.000121252	55.5083597	2.78367E-05	4.63945E-07	0.008947822	3.43684E-05	0.001052178	8.947822166	
30.0	0.000120788	55.50835923	2.77302E-05	4.6217E-07	0.008913585	3.42369E-05	0.001086415	8.913585305	
31.0	0.000120326	55.50835877	2.76241E-05	4.60402E-07	0.008879479	3.41059E-05	0.001120521	8.879479445	
32.0	0.000119866	55.50835831	2.75184E-05	4.5864E-07	0.008845504	3.39754E-05	0.001154496	8.845504083	
33.0	0.000119407	55.50835785	2.74131E-05	4.56885E-07	0.008811659	3.38454E-05	0.001188341	8.81165872	
34.0	0.00011895	55.5083574	2.73082E-05	4.55137E-07	0.008777943	3.37159E-05	0.001222057	8.77794286	
35.0	0.000118495	55.50835694	2.72037E-05	4.53395E-07	0.008744356	3.35869E-05	0.001255644	8.744356006	
36.0	0.000118042	55.50835649	2.70996E-05	4.51661E-07	0.008710898	3.34583E-05	0.001289102	8.710897665	
37.0	0.00011759	55.50835604	2.69959E-05	4.49932E-07	0.008677567	3.33303E-05	0.001322433	8.677567346	
38.0	0.00011714	55.50835559	2.68927E-05	4.48211E-07	0.008644365	3.32028E-05	0.001355635	8.644364557	
39.0	0.000116692	55.50835514	2.67898E-05	4.46496E-07	0.008611289	3.30757E-05	0.001388711	8.611288812	
40.0	0.000116245	55.50835469	2.66872E-05	4.44787E-07	0.00857834	3.29492E-05	0.00142166	8.578339625	
41.0	0.000115801	55.50835425	2.65851E-05	4.43086E-07	0.008545517	3.28231E-05	0.001454483	8.54551651	
42.0	0.000115358	55.5083538	2.64834E-05	4.4139E-07	0.008512819	3.26975E-05	0.001487181	8.512818986	
43.0	0.000114916	55.50835336	2.63821E-05	4.39701E-07	0.008480247	3.25724E-05	0.001519753	8.480246572	
44.0	0.000114476	55.50835292	2.62811E-05	4.38019E-07	0.008447799	3.24478E-05	0.001552201	8.44779879	
45.0	0.000114038	55.50835248	2.61806E-05	4.36343E-07	0.008415475	3.23236E-05	0.001584525	8.415475162	
46.0	0.000113602	55.50835205	2.60804E-05	4.34673E-07	0.008383275	3.21999E-05	0.001616725	8.383275213	
47.0	0.000113167	55.50835161	2.59806E-05	4.3301E-07	0.008351198	3.20767E-05	0.001648802	8.351198471	
48.0	0.000112734	55.50835118	2.58812E-05	4.31353E-07	0.008319244	3.1954E-05	0.001680756	8.319244463	
49.0	0.000112303	55.50835075	2.57822E-05	4.29703E-07	0.008287413	3.18317E-05	0.001712587	8.287412721	
50.0	0.000111873	55.50835032	2.56835E-05	4.28059E-07	0.008255703	3.17099E-05	0.001744297	8.255702775	
51.0	0.000111445	55.50834989	2.55852E-05	4.26421E-07	0.008224114	3.15886E-05	0.001775886	8.224114162	
52.0	0.000111019	55.50834947	2.54874E-05	4.24789E-07	0.008192646	3.14677E-05	0.001807354	8.192646415	
53.0	0.000110594	55.50834904	2.53898E-05	4.23164E-07	0.008161299	3.13473E-05	0.001838701	8.161299073	
54.0	0.000110171	55.50834862	2.52927E-05	4.21545E-07	0.008130072	3.12274E-05	0.001869928	8.130071675	
55.0	0.000109749	55.5083482	2.51959E-05	4.19932E-07	0.008098964	3.11079E-05	0.001901036	8.098963761	
56.0	0.000109329	55.50834778	2.50995E-05	4.18325E-07	0.008067975	3.09889E-05	0.001932025	8.067974876	
57.0	0.000108911	55.50834736	2.50035E-05	4.16724E-07	0.008037105	3.08703E-05	0.001962895	8.037104562	
58.0	0.000108494	55.50834694	2.49078E-05	4.1513E-07	0.008006352	3.07522E-05	0.001993648	8.006352368	
59.0	0.000108079	55.50834653	2.48125E-05	4.13541E-07	0.007975718	3.06345E-05	0.002024282	7.97571784	
60.0	0.000107666	55.50834611	2.47175E-05	4.11959E-07	0.007945201	3.05173E-05	0.002054799	7.945200528	
61.0	0.000107254	55.5083457	2.4623E-05	4.10383E-07	0.0079148	3.04005E-05	0.0020852	7.914799985	
62.0	0.000106843	55.50834529	2.45288E-05	4.08813E-07	0.007884516	3.02842E-05	0.002115484	7.884515762	
63.0	0.000106435	55.50834488	2.44349E-05	4.07248E-07	0.007854347	3.01683E-05	0.002145653	7.854347416	
64.0	0.000106027	55.50834447	2.43414E-05	4.0569E-07	0.007824295	3.00529E-05	0.002175705	7.824294502	
65.0	0.000105622	55.50834407	2.42483E-05	4.04138E-07	0.007794357	2.99379E-05	0.002205643	7.79435658	
66.0	0.000105218	55.50834366	2.41555E-05	4.02591E-07	0.007764533	2.98234E-05	0.002235467	7.764533208	
67.0	0.000104815	55.50834326	2.40631E-05	4.01051E-07	0.007734824	2.97093E-05	0.002265176	7.734823949	

68.0	0.000104414	55.50834286	2.3971E-05	3.99516E-07	0.007705228	2.95956E-05	0.002294772	7.705228366
69.0	0.000104014	55.50834246	2.38793E-05	3.97988E-07	0.007675746	2.94823E-05	0.002324254	7.675746024
70.0	0.000103616	55.50834206	2.37879E-05	3.96465E-07	0.007646376	2.93695E-05	0.002353624	7.646376491
71.0	0.00010322	55.50834167	2.36969E-05	3.94948E-07	0.007617119	2.92572E-05	0.002382881	7.617119333
72.0	0.000102825	55.50834127	2.36062E-05	3.93437E-07	0.007587974	2.91452E-05	0.002412026	7.587974121
73.0	0.000102432	55.50834088	2.35159E-05	3.91931E-07	0.00755894	2.90337E-05	0.00244106	7.558940428
74.0	0.00010204	55.50834049	2.34259E-05	3.90432E-07	0.007530018	2.89226E-05	0.002469982	7.530017825
75.0	0.000101649	55.5083401	2.33363E-05	3.88938E-07	0.007501206	2.88119E-05	0.002498794	7.501205889
76.0	0.00010126	55.50833971	2.3247E-05	3.8745E-07	0.007472504	2.87017E-05	0.002527496	7.472504195
77.0	0.000100873	55.50833932	2.3158E-05	3.85967E-07	0.007443912	2.85919E-05	0.002556088	7.443912322
78.0	0.000100487	55.50833893	2.30694E-05	3.8449E-07	0.00741543	2.84825E-05	0.00258457	7.41542985
79.0	0.000100102	55.50833855	2.29812E-05	3.83019E-07	0.007387056	2.83735E-05	0.002612944	7.38705636
80.0	9.97193E-05	55.50833817	2.28932E-05	3.81554E-07	0.007358791	2.82649E-05	0.002641209	7.358791435
81.0	9.93377E-05	55.50833778	2.28056E-05	3.80094E-07	0.007330635	2.81568E-05	0.002669365	7.330634659
82.0	9.89577E-05	55.5083374	2.27184E-05	3.78639E-07	0.007302586	2.8049E-05	0.002697414	7.30258562
83.0	9.8579E-05	55.50833703	2.26314E-05	3.77191E-07	0.007274644	2.79417E-05	0.002725356	7.274643903
84.0	9.82018E-05	55.50833665	2.25448E-05	3.75747E-07	0.007246809	2.78348E-05	0.002753191	7.2468091
85.0	9.78261E-05	55.50833627	2.24586E-05	3.7431E-07	0.007219081	2.77283E-05	0.002780919	7.219080801
86.0	9.74518E-05	55.5083359	2.23726E-05	3.72877E-07	0.007191459	2.76222E-05	0.002808541	7.191458598
87.0	9.70789E-05	55.50833553	2.2287E-05	3.71451E-07	0.007163942	2.75165E-05	0.002836058	7.163942085
88.0	9.67074E-05	55.50833515	2.22018E-05	3.70029E-07	0.007136531	2.74112E-05	0.002863469	7.136530859
89.0	9.63374E-05	55.50833478	2.21168E-05	3.68614E-07	0.007109225	2.73063E-05	0.002890775	7.109224515
90.0	9.59688E-05	55.50833441	2.20322E-05	3.67203E-07	0.007082023	2.72019E-05	0.002917977	7.082022654
91.0	9.56016E-05	55.50833405	2.19479E-05	3.65798E-07	0.007054925	2.70978E-05	0.002945075	7.054924874
92.0	9.52358E-05	55.50833368	2.18639E-05	3.64399E-07	0.007027931	2.69941E-05	0.002972069	7.027930778
93.0	9.48714E-05	55.50833332	2.17803E-05	3.63004E-07	0.00700104	2.68908E-05	0.00299896	7.001039969
94.0	9.45084E-05	55.50833295	2.16969E-05	3.61615E-07	0.006974252	2.67879E-05	0.003025748	6.974252052
95.0	9.41468E-05	55.50833259	2.16139E-05	3.60232E-07	0.006947567	2.66854E-05	0.003052433	6.947566634
96.0	9.37865E-05	55.50833223	2.15312E-05	3.58853E-07	0.006920983	2.65833E-05	0.003079017	6.920983321
97.0	9.34277E-05	55.50833187	2.14488E-05	3.5748E-07	0.006894502	2.64816E-05	0.003105498	6.894501723
98.0	9.30702E-05	55.50833152	2.13667E-05	3.56112E-07	0.006868121	2.63803E-05	0.003131879	6.868121452
99.0	9.27141E-05	55.50833116	2.1285E-05	3.5475E-07	0.006841842	2.62793E-05	0.003158158	6.841842119
100.0	9.23594E-05	55.50833081	2.12035E-05	3.53392E-07	0.006815663	2.61788E-05	0.003184337	6.815663338
101.0	9.2006E-05	55.50833045	2.11224E-05	3.5204E-07	0.006789585	2.60786E-05	0.003210415	6.789584724
102.0	9.16539E-05	55.5083301	2.10416E-05	3.50693E-07	0.006763606	2.59788E-05	0.003236394	6.763605895
103.0	9.13032E-05	55.50832975	2.09611E-05	3.49351E-07	0.006737726	2.58794E-05	0.003262274	6.737726468
104.0	9.09539E-05	55.5083294	2.08809E-05	3.48015E-07	0.006711946	2.57804E-05	0.003288054	6.711946063
105.0	9.06059E-05	55.50832905	2.0801E-05	3.46683E-07	0.006686264	2.56818E-05	0.003313736	6.686264301
106.0	9.02592E-05	55.50832871	2.07214E-05	3.45357E-07	0.006660681	2.55835E-05	0.003339319	6.660680805
107.0	8.99138E-05	55.50832836	2.06421E-05	3.44035E-07	0.006635195	2.54856E-05	0.003364805	6.635195199
108.0	8.95698E-05	55.50832802	2.05631E-05	3.42719E-07	0.006609807	2.53881E-05	0.003390193	6.609807108
109.0	8.92271E-05	55.50832767	2.04844E-05	3.41407E-07	0.006584516	2.52909E-05	0.003415484	6.584516158
110.0	8.88857E-05	55.50832733	2.04061E-05	3.40101E-07	0.006559322	2.51942E-05	0.003440678	6.559321979
111.0	8.85456E-05	55.50832699	2.0328E-05	3.388E-07	0.006534224	2.50978E-05	0.003465776	6.5342242
112.0	8.82068E-05	55.50832665	2.02502E-05	3.37503E-07	0.006509222	2.50017E-05	0.003490778	6.509222453
113.0	8.78693E-05	55.50832632	2.01727E-05	3.36212E-07	0.006484316	2.49061E-05	0.003515684	6.484316369
114.0	8.7533E-05	55.50832598	2.00955E-05	3.34926E-07	0.006459506	2.48108E-05	0.003540494	6.459505582
115.0	8.71981E-05	55.50832564	2.00186E-05	3.33644E-07	0.00643479	2.47159E-05	0.00356521	6.434789729

116.0	8.68645E-05	55.50832531	1.9942E-05	3.32367E-07	0.006410168	2.46213E-05	0.003589832	6.410168446	
117.0	8.65321E-05	55.50832498	1.98657E-05	3.31096E-07	0.006385641	2.45271E-05	0.003614359	6.38564137	
118.0	8.6201E-05	55.50832465	1.97897E-05	3.29829E-07	0.006361208	2.44332E-05	0.003638792	6.361208142	
119.0	8.58712E-05	55.50832432	1.9714E-05	3.28567E-07	0.006336868	2.43397E-05	0.003663132	6.336868403	
120.0	8.55426E-05	55.50832399	1.96386E-05	3.2731E-07	0.006312622	2.42466E-05	0.003687378	6.312621794	
121.0	8.52153E-05	55.50832366	1.95634E-05	3.26057E-07	0.006288468	2.41538E-05	0.003711532	6.28846796	
122.0	8.48892E-05	55.50832334	1.94886E-05	3.2481E-07	0.006264407	2.40614E-05	0.003735593	6.264406545	
123.0	8.45644E-05	55.50832301	1.9414E-05	3.23567E-07	0.006240437	2.39693E-05	0.003759563	6.240437196	
124.0	8.42409E-05	55.50832269	1.93397E-05	3.22329E-07	0.00621656	2.38776E-05	0.00378344	6.21655956	
125.0	8.39185E-05	55.50832236	1.92657E-05	3.21096E-07	0.006192773	2.37863E-05	0.003807227	6.192773287	
126.0	8.35974E-05	55.50832204	1.9192E-05	3.19867E-07	0.006169078	2.36953E-05	0.003830922	6.169078026	
127.0	8.32776E-05	55.50832172	1.91186E-05	3.18643E-07	0.006145473	2.36046E-05	0.003854527	6.145473431	
128.0	8.29589E-05	55.50832141	1.90454E-05	3.17424E-07	0.006121959	2.35143E-05	0.003878041	6.121959153	
129.0	8.26415E-05	55.50832109	1.89726E-05	3.16209E-07	0.006098535	2.34243E-05	0.003901465	6.098534848	
130.0	8.23253E-05	55.50832077	1.89E-05	3.14999E-07	0.0060752	2.33347E-05	0.0039248	6.075200171	
131.0	8.20103E-05	55.50832046	1.88276E-05	3.13794E-07	0.006051955	2.32454E-05	0.003948045	6.051954778	
132.0	8.16965E-05	55.50832014	1.87556E-05	3.12593E-07	0.006028798	2.31564E-05	0.003971202	6.028798329	
133.0	8.13839E-05	55.50831983	1.86838E-05	3.11397E-07	0.00600573	2.30678E-05	0.00399427	6.005730483	
134.0	8.10725E-05	55.50831952	1.86123E-05	3.10206E-07	0.005982751	2.29796E-05	0.004017249	5.982750902	
135.0	8.07623E-05	55.50831921	1.85411E-05	3.09019E-07	0.005959859	2.28917E-05	0.004040141	5.959859246	
136.0	8.04533E-05	55.5083189	1.84702E-05	3.07836E-07	0.005937055	2.28041E-05	0.004062945	5.937055181	
137.0	8.01455E-05	55.50831859	1.83995E-05	3.06659E-07	0.005914338	2.27168E-05	0.004085662	5.91433837	
138.0	7.98388E-05	55.50831828	1.83291E-05	3.05485E-07	0.005891708	2.26299E-05	0.004108292	5.89170848	
139.0	7.95333E-05	55.50831798	1.8259E-05	3.04316E-07	0.005869165	2.25433E-05	0.004130835	5.869165179	
140.0	7.9229E-05	55.50831768	1.81891E-05	3.03152E-07	0.005846708	2.2457E-05	0.004153292	5.846708134	
141.0	7.89258E-05	55.50831737	1.81195E-05	3.01992E-07	0.005824337	2.23711E-05	0.004175663	5.824337017	
142.0	7.86239E-05	55.50831707	1.80502E-05	3.00837E-07	0.005802051	2.22855E-05	0.004197949	5.802051497	
143.0	7.8323E-05	55.50831677	1.79811E-05	2.99685E-07	0.005779851	2.22002E-05	0.004220149	5.779851249	
144.0	7.80233E-05	55.50831647	1.79123E-05	2.98539E-07	0.005757736	2.21153E-05	0.004242264	5.757735944	
145.0	7.77248E-05	55.50831617	1.78438E-05	2.97396E-07	0.005735705	2.20307E-05	0.004264295	5.735705259	
146.0	7.74274E-05	55.50831587	1.77755E-05	2.96259E-07	0.005713759	2.19464E-05	0.004286241	5.71375887	
147.0	7.71311E-05	55.50831558	1.77075E-05	2.95125E-07	0.005691896	2.18624E-05	0.004308104	5.691896454	
148.0	7.6836E-05	55.50831528	1.76397E-05	2.93996E-07	0.005670118	2.17788E-05	0.004329882	5.670117689	
149.0	7.6542E-05	55.50831499	1.75723E-05	2.92871E-07	0.005648422	2.16954E-05	0.004351578	5.648422257	
150.0	7.62491E-05	55.5083147	1.7505E-05	2.9175E-07	0.00562681	2.16124E-05	0.00437319	5.626809837	
151.0	7.59574E-05	55.5083144	1.7438E-05	2.90634E-07	0.00560528	2.15297E-05	0.00439472	5.605280112	
152.0	7.56668E-05	55.50831411	1.73713E-05	2.89522E-07	0.005583833	2.14473E-05	0.004416167	5.583832766	
153.0	7.53772E-05	55.50831382	1.73048E-05	2.88414E-07	0.005562467	2.13653E-05	0.004437533	5.562467483	
154.0	7.50888E-05	55.50831354	1.72386E-05	2.87311E-07	0.005541184	2.12835E-05	0.004458816	5.54118395	
155.0	7.48015E-05	55.50831325	1.71727E-05	2.86211E-07	0.005519982	2.12021E-05	0.004480018	5.519981854	
156.0	7.45153E-05	55.50831296	1.7107E-05	2.85116E-07	0.005498861	2.1121E-05	0.004501139	5.498860883	
157.0	7.42302E-05	55.50831268	1.70415E-05	2.84025E-07	0.005477821	2.10402E-05	0.004522179	5.477820727	
158.0	7.39462E-05	55.50831239	1.69763E-05	2.82938E-07	0.005456861	2.09597E-05	0.004543139	5.456861076	
159.0	7.36632E-05	55.50831211	1.69113E-05	2.81856E-07	0.005435982	2.08795E-05	0.004564018	5.435981623	
160.0	7.33814E-05	55.50831183	1.68466E-05	2.80777E-07	0.005415182	2.07996E-05	0.004584818	5.41518206	
161.0	7.31006E-05	55.50831155	1.67822E-05	2.79703E-07	0.005394462	2.072E-05	0.004605538	5.394462083	
162.0	7.28209E-05	55.50831127	1.6718E-05	2.78633E-07	0.005373821	2.06407E-05	0.004626179	5.373821386	
163.0	7.25423E-05	55.50831099	1.6654E-05	2.77567E-07	0.00535326	2.05617E-05	0.00464674	5.353259666	

164.0	7.22647E-05	55.50831071	1.65903E-05	2.76505E-07	0.005332777	2.0483E-05	0.004667223	5.33277662
165.0	7.19882E-05	55.50831043	1.65268E-05	2.75447E-07	0.005312372	2.04047E-05	0.004687628	5.312371949
166.0	7.17127E-05	55.50831016	1.64636E-05	2.74393E-07	0.005292045	2.03266E-05	0.004707955	5.292045352
167.0	7.14383E-05	55.50830988	1.64006E-05	2.73343E-07	0.005271797	2.02488E-05	0.004728203	5.27179653
168.0	7.1165E-05	55.50830961	1.63378E-05	2.72297E-07	0.005251625	2.01713E-05	0.004748375	5.251625185
169.0	7.08927E-05	55.50830934	1.62753E-05	2.71255E-07	0.005231531	2.00942E-05	0.004768469	5.231531022
170.0	7.06214E-05	55.50830907	1.6213E-05	2.70217E-07	0.005211514	2.00173E-05	0.004788486	5.211513745
171.0	7.03512E-05	55.5083088	1.6151E-05	2.69183E-07	0.005191573	1.99407E-05	0.004808427	5.191573059
172.0	7.0082E-05	55.50830853	1.60892E-05	2.68153E-07	0.005171709	1.98644E-05	0.004828291	5.171708673
173.0	6.98139E-05	55.50830826	1.60276E-05	2.67127E-07	0.00515192	1.97884E-05	0.00484808	5.151920292
174.0	6.95468E-05	55.50830799	1.59663E-05	2.66105E-07	0.005132208	1.97127E-05	0.004867792	5.132207628
175.0	6.92807E-05	55.50830773	1.59052E-05	2.65087E-07	0.00511257	1.96372E-05	0.00488743	5.11257039
176.0	6.90156E-05	55.50830746	1.58444E-05	2.64073E-07	0.005093008	1.95621E-05	0.004906992	5.093008289
177.0	6.87515E-05	55.5083072	1.57837E-05	2.63062E-07	0.005073521	1.94873E-05	0.004926479	5.073521039
178.0	6.84884E-05	55.50830693	1.57233E-05	2.62056E-07	0.005054108	1.94127E-05	0.004945892	5.054108352
179.0	6.82264E-05	55.50830667	1.56632E-05	2.61053E-07	0.00503477	1.93384E-05	0.00496523	5.034769943
180.0	6.79653E-05	55.50830641	1.56032E-05	2.60054E-07	0.005015506	1.92644E-05	0.004984494	5.015505529
181.0	6.77053E-05	55.50830615	1.55435E-05	2.59059E-07	0.004996315	1.91907E-05	0.005003685	4.996314826
182.0	6.74462E-05	55.50830589	1.54841E-05	2.58068E-07	0.004977198	1.91173E-05	0.005022802	4.977197552
183.0	6.71882E-05	55.50830563	1.54248E-05	2.5708E-07	0.004958153	1.90441E-05	0.005041847	4.958153425
184.0	6.69311E-05	55.50830538	1.53658E-05	2.56097E-07	0.004939182	1.89713E-05	0.005060818	4.939182167
185.0	6.6675E-05	55.50830512	1.5307E-05	2.55117E-07	0.004920283	1.88987E-05	0.005079717	4.920283499
186.0	6.64199E-05	55.50830487	1.52484E-05	2.54141E-07	0.004901457	1.88264E-05	0.005098543	4.901457141
187.0	6.61657E-05	55.50830461	1.51901E-05	2.53168E-07	0.004882703	1.87543E-05	0.005117297	4.882702819
188.0	6.59125E-05	55.50830436	1.5132E-05	2.522E-07	0.00486402	1.86826E-05	0.00513598	4.864020256
189.0	6.56604E-05	55.50830411	1.50741E-05	2.51235E-07	0.004845409	1.86111E-05	0.005154591	4.845409178
190.0	6.54091E-05	55.50830386	1.50164E-05	2.50273E-07	0.004826869	1.85399E-05	0.005173131	4.826869311
191.0	6.51588E-05	55.50830361	1.49589E-05	2.49316E-07	0.0048084	1.84689E-05	0.0051916	4.808400382
192.0	6.49095E-05	55.50830336	1.49017E-05	2.48362E-07	0.004790002	1.83983E-05	0.005209998	4.790002121
193.0	6.46612E-05	55.50830311	1.48447E-05	2.47411E-07	0.004771674	1.83279E-05	0.005228326	4.771674257
194.0	6.44138E-05	55.50830286	1.47879E-05	2.46465E-07	0.004753417	1.82577E-05	0.005246583	4.75341652
195.0	6.41673E-05	55.50830261	1.47313E-05	2.45522E-07	0.004735229	1.81879E-05	0.005264771	4.735228643
196.0	6.39218E-05	55.50830237	1.46749E-05	2.44582E-07	0.00471711	1.81183E-05	0.00528289	4.717110357
197.0	6.36772E-05	55.50830212	1.46188E-05	2.43646E-07	0.004699061	1.8049E-05	0.005300939	4.699061397
198.0	6.34335E-05	55.50830188	1.45628E-05	2.42714E-07	0.004681081	1.79799E-05	0.005318919	4.681081498
199.0	6.31908E-05	55.50830164	1.45071E-05	2.41785E-07	0.00466317	1.79111E-05	0.00533683	4.663170394
200.0	6.2949E-05	55.5083014	1.44516E-05	2.4086E-07	0.004645328	1.78426E-05	0.005354672	4.645327823
201.0	6.27082E-05	55.50830115	1.43963E-05	2.39939E-07	0.004627554	1.77743E-05	0.005372446	4.627553524
202.0	6.24682E-05	55.50830091	1.43412E-05	2.39021E-07	0.004609847	1.77063E-05	0.005390153	4.609847233
203.0	6.22292E-05	55.50830068	1.42864E-05	2.38106E-07	0.004592209	1.76385E-05	0.005407791	4.592208692
204.0	6.19911E-05	55.50830044	1.42317E-05	2.37195E-07	0.004574638	1.75711E-05	0.005425362	4.57463764
205.0	6.17539E-05	55.5083002	1.41772E-05	2.36287E-07	0.004557134	1.75038E-05	0.005442866	4.557133821
206.0	6.15176E-05	55.50829996	1.4123E-05	2.35383E-07	0.004539697	1.74368E-05	0.005460303	4.539696975
207.0	6.12822E-05	55.50829973	1.4069E-05	2.34483E-07	0.004522327	1.73701E-05	0.005477673	4.522326849
208.0	6.10478E-05	55.50829949	1.40151E-05	2.33586E-07	0.004505023	1.73037E-05	0.005494977	4.505023185
209.0	6.08142E-05	55.50829926	1.39615E-05	2.32692E-07	0.004487786	1.72375E-05	0.005512214	4.487785729
210.0	6.05815E-05	55.50829903	1.39081E-05	2.31801E-07	0.004470614	1.71715E-05	0.005529386	4.470614229
211.0	6.03497E-05	55.5082988	1.38549E-05	2.30914E-07	0.004453508	1.71058E-05	0.005546492	4.453508432

212.0	6.01188E-05	55.50829856	1.38019E-05	2.30031E-07	0.004436468	1.70403E-05	0.005563532	4.436468087
213.0	5.98887E-05	55.50829833	1.3749E-05	2.29151E-07	0.004419493	1.69751E-05	0.005580507	4.419492942
214.0	5.96596E-05	55.50829811	1.36964E-05	2.28274E-07	0.004402583	1.69102E-05	0.005597417	4.40258275
215.0	5.94313E-05	55.50829788	1.3644E-05	2.27401E-07	0.004385737	1.68455E-05	0.005614263	4.38573726
216.0	5.92039E-05	55.50829765	1.35918E-05	2.2653E-07	0.004368956	1.6781E-05	0.005631044	4.368956226
217.0	5.89774E-05	55.50829742	1.35398E-05	2.25664E-07	0.004352239	1.67168E-05	0.005647761	4.352239401
218.0	5.87517E-05	55.5082972	1.3488E-05	2.248E-07	0.004335587	1.66529E-05	0.005664413	4.335586539
219.0	5.85269E-05	55.50829697	1.34364E-05	2.2394E-07	0.004318997	1.65891E-05	0.005681003	4.318997395
220.0	5.8303E-05	55.50829675	1.3385E-05	2.23083E-07	0.004302472	1.65257E-05	0.005697528	4.302471726
221.0	5.80799E-05	55.50829653	1.33338E-05	2.2223E-07	0.004286009	1.64624E-05	0.005713991	4.286009289
222.0	5.78577E-05	55.5082963	1.32828E-05	2.21379E-07	0.00426961	1.63994E-05	0.00573039	4.269609842
223.0	5.76363E-05	55.50829608	1.32319E-05	2.20532E-07	0.004253273	1.63367E-05	0.005746727	4.253273144
224.0	5.74158E-05	55.50829586	1.31813E-05	2.19688E-07	0.004236999	1.62742E-05	0.005763001	4.236998954
225.0	5.71961E-05	55.50829564	1.31309E-05	2.18848E-07	0.004220787	1.62119E-05	0.005779213	4.220787034
226.0	5.69772E-05	55.50829542	1.30806E-05	2.1801E-07	0.004204637	1.61499E-05	0.005795363	4.204637145
227.0	5.67592E-05	55.50829521	1.30306E-05	2.17176E-07	0.004188549	1.60881E-05	0.005811451	4.188549051
228.0	5.6542E-05	55.50829499	1.29807E-05	2.16345E-07	0.004172523	1.60265E-05	0.005827477	4.172522514
229.0	5.63257E-05	55.50829477	1.29311E-05	2.15518E-07	0.004156557	1.59652E-05	0.005843443	4.156557298
230.0	5.61102E-05	55.50829456	1.28816E-05	2.14693E-07	0.004140653	1.59041E-05	0.005859347	4.140653171
231.0	5.58955E-05	55.50829434	1.28323E-05	2.13871E-07	0.00412481	1.58433E-05	0.00587519	4.124809896
232.0	5.56816E-05	55.50829413	1.27832E-05	2.13053E-07	0.004109027	1.57827E-05	0.005890973	4.109027243
233.0	5.54686E-05	55.50829391	1.27343E-05	2.12238E-07	0.004093305	1.57223E-05	0.005906695	4.093304978
234.0	5.52563E-05	55.5082937	1.26855E-05	2.11426E-07	0.004077643	1.56621E-05	0.005922357	4.077642871
235.0	5.50449E-05	55.50829349	1.2637E-05	2.10617E-07	0.004062041	1.56022E-05	0.005937959	4.062040692
236.0	5.48343E-05	55.50829328	1.25887E-05	2.09811E-07	0.004046498	1.55425E-05	0.005953502	4.046498211
237.0	5.46245E-05	55.50829307	1.25405E-05	2.09008E-07	0.004031015	1.5483E-05	0.005968985	4.0310152
238.0	5.44155E-05	55.50829286	1.24925E-05	2.08208E-07	0.004015591	1.54238E-05	0.005984409	4.015591431
239.0	5.42072E-05	55.50829265	1.24447E-05	2.07412E-07	0.004000227	1.53648E-05	0.005999773	4.000226678
240.0	5.39998E-05	55.50829245	1.23971E-05	2.06618E-07	0.003984921	1.5306E-05	0.006015079	3.984920714
241.0	5.37932E-05	55.50829224	1.23497E-05	2.05828E-07	0.003969673	1.52474E-05	0.006030327	3.969673316
242.0	5.35874E-05	55.50829203	1.23024E-05	2.0504E-07	0.003954484	1.51891E-05	0.006045516	3.954484258
243.0	5.33823E-05	55.50829183	1.22553E-05	2.04255E-07	0.003939353	1.51309E-05	0.006060647	3.939353318
244.0	5.31781E-05	55.50829162	1.22084E-05	2.03474E-07	0.00392428	1.5073E-05	0.00607572	3.924280273
245.0	5.29746E-05	55.50829142	1.21617E-05	2.02695E-07	0.003909265	1.50154E-05	0.006090735	3.909264901
246.0	5.27719E-05	55.50829122	1.21152E-05	2.0192E-07	0.003894307	1.49579E-05	0.006105693	3.894306983
247.0	5.257E-05	55.50829102	1.20688E-05	2.01147E-07	0.003879406	1.49007E-05	0.006120594	3.879406298
248.0	5.23689E-05	55.50829082	1.20227E-05	2.00378E-07	0.003864563	1.48437E-05	0.006135437	3.864562627
249.0	5.21685E-05	55.50829061	1.19767E-05	1.99611E-07	0.003849776	1.47869E-05	0.006150224	3.849775751
250.0	5.19689E-05	55.50829042	1.19308E-05	1.98847E-07	0.003835045	1.47303E-05	0.006164955	3.835045455
251.0	5.177E-05	55.50829022	1.18852E-05	1.98086E-07	0.003820372	1.46739E-05	0.006179628	3.820371521
252.0	5.15719E-05	55.50829002	1.18397E-05	1.97328E-07	0.003805754	1.46178E-05	0.006194246	3.805753733
253.0	5.13746E-05	55.50828982	1.17944E-05	1.96573E-07	0.003791192	1.45619E-05	0.006208808	3.791191877
254.0	5.1178E-05	55.50828962	1.17493E-05	1.95821E-07	0.003776686	1.45061E-05	0.006223314	3.776685739
255.0	5.09822E-05	55.50828943	1.17043E-05	1.95072E-07	0.003762235	1.44506E-05	0.006237765	3.762235105
256.0	5.07871E-05	55.50828923	1.16595E-05	1.94326E-07	0.00374784	1.43953E-05	0.00625216	3.747839763
257.0	5.05928E-05	55.50828904	1.16149E-05	1.93582E-07	0.0037335	1.43403E-05	0.0062665	3.733499502
258.0	5.03992E-05	55.50828885	1.15705E-05	1.92841E-07	0.003719214	1.42854E-05	0.006280786	3.719214111
259.0	5.02064E-05	55.50828865	1.15262E-05	1.92103E-07	0.003704983	1.42307E-05	0.006295017	3.70498338

260.0	5.00143E-05	55.50828846	1.14821E-05	1.91368E-07	0.003690807	1.41763E-05	0.006309193	3.690807099
261.0	4.98229E-05	55.50828827	1.14382E-05	1.90636E-07	0.003676685	1.4122E-05	0.006323315	3.676685061
262.0	4.96323E-05	55.50828808	1.13944E-05	1.89907E-07	0.003662617	1.4068E-05	0.006337383	3.662617057
263.0	4.94424E-05	55.50828789	1.13508E-05	1.8918E-07	0.003648603	1.40142E-05	0.006351397	3.648602882
264.0	4.92532E-05	55.5082877	1.13074E-05	1.88456E-07	0.003634642	1.39606E-05	0.006365358	3.634642329
265.0	4.90647E-05	55.50828751	1.12641E-05	1.87735E-07	0.003620735	1.39071E-05	0.006379265	3.620735192
266.0	4.8877E-05	55.50828732	1.1221E-05	1.87017E-07	0.003606881	1.38539E-05	0.006393119	3.606881269
267.0	4.869E-05	55.50828714	1.11781E-05	1.86301E-07	0.00359308	1.38009E-05	0.00640692	3.593080354
268.0	4.85037E-05	55.50828695	1.11353E-05	1.85588E-07	0.003579332	1.37481E-05	0.006420668	3.579332245
269.0	4.83181E-05	55.50828676	1.10927E-05	1.84878E-07	0.003565637	1.36955E-05	0.006434363	3.565636741
270.0	4.81332E-05	55.50828658	1.10503E-05	1.84171E-07	0.003551994	1.36431E-05	0.006448006	3.551993639
271.0	4.7949E-05	55.5082864	1.1008E-05	1.83466E-07	0.003538403	1.35909E-05	0.006461597	3.538402739
272.0	4.77656E-05	55.50828621	1.09659E-05	1.82764E-07	0.003524864	1.35389E-05	0.006475136	3.524863842
273.0	4.75828E-05	55.50828603	1.09239E-05	1.82065E-07	0.003511377	1.34871E-05	0.006488623	3.511376749
274.0	4.74008E-05	55.50828585	1.08821E-05	1.81368E-07	0.003497941	1.34355E-05	0.006502059	3.497941261
275.0	4.72194E-05	55.50828567	1.08405E-05	1.80674E-07	0.003484557	1.33841E-05	0.006515443	3.484557181
276.0	4.70387E-05	55.50828548	1.0799E-05	1.79983E-07	0.003471224	1.33329E-05	0.006528776	3.471224312
277.0	4.68587E-05	55.5082853	1.07577E-05	1.79294E-07	0.003457942	1.32819E-05	0.006542058	3.457942458
278.0	4.66794E-05	55.50828513	1.07165E-05	1.78608E-07	0.003444711	1.3231E-05	0.006555289	3.444711424
279.0	4.65008E-05	55.50828495	1.06755E-05	1.77925E-07	0.003431531	1.31804E-05	0.006568469	3.431531016
280.0	4.63229E-05	55.50828477	1.06346E-05	1.77244E-07	0.003418401	1.313E-05	0.006581599	3.41840104
281.0	4.61457E-05	55.50828459	1.0594E-05	1.76566E-07	0.003405321	1.30797E-05	0.006594679	3.405321303
282.0	4.59691E-05	55.50828442	1.05534E-05	1.7589E-07	0.003392292	1.30297E-05	0.006607708	3.392291612
283.0	4.57932E-05	55.50828424	1.0513E-05	1.75217E-07	0.003379312	1.29798E-05	0.006620688	3.379311777
284.0	4.5618E-05	55.50828406	1.04728E-05	1.74547E-07	0.003366382	1.29302E-05	0.006633618	3.366381606
285.0	4.54434E-05	55.50828389	1.04327E-05	1.73879E-07	0.003353501	1.28807E-05	0.006646499	3.35350091
286.0	4.52696E-05	55.50828372	1.03928E-05	1.73214E-07	0.003340669	1.28314E-05	0.006659331	3.340669498
287.0	4.50963E-05	55.50828354	1.03531E-05	1.72551E-07	0.003327887	1.27823E-05	0.006672113	3.327887183
288.0	4.49238E-05	55.50828337	1.03134E-05	1.71891E-07	0.003315154	1.27334E-05	0.006684846	3.315153777
289.0	4.47519E-05	55.5082832	1.0274E-05	1.71233E-07	0.003302469	1.26847E-05	0.006697531	3.302469092
290.0	4.45807E-05	55.50828303	1.02347E-05	1.70578E-07	0.003289833	1.26361E-05	0.006710167	3.289832943
291.0	4.44101E-05	55.50828286	1.01955E-05	1.69925E-07	0.003277245	1.25878E-05	0.006722755	3.277245143
292.0	4.42402E-05	55.50828269	1.01565E-05	1.69275E-07	0.003264706	1.25396E-05	0.006735294	3.264705507
293.0	4.40709E-05	55.50828252	1.01176E-05	1.68627E-07	0.003252214	1.24917E-05	0.006747786	3.252213851
294.0	4.39023E-05	55.50828235	1.00789E-05	1.67982E-07	0.00323977	1.24439E-05	0.00676023	3.239769992
295.0	4.37343E-05	55.50828218	1.00404E-05	1.67339E-07	0.003227374	1.23962E-05	0.006772626	3.227373747
296.0	4.35669E-05	55.50828201	1.00019E-05	1.66699E-07	0.003215025	1.23488E-05	0.006784975	3.215024933
297.0	4.34002E-05	55.50828185	9.96367E-06	1.66061E-07	0.003202723	1.23016E-05	0.006797277	3.202723369
298.0	4.32342E-05	55.50828168	9.92555E-06	1.65426E-07	0.003190469	1.22545E-05	0.006809531	3.190468874
299.0	4.30688E-05	55.50828151	9.88757E-06	1.64793E-07	0.003178261	1.22076E-05	0.006821739	3.178261268
300.0	4.2904E-05	55.50828135	9.84974E-06	1.64162E-07	0.0031661	1.21609E-05	0.0068339	3.166100372
301.0	4.27398E-05	55.50828119	9.81205E-06	1.63534E-07	0.003153986	1.21144E-05	0.006846014	3.153986007
302.0	4.25763E-05	55.50828102	9.77451E-06	1.62908E-07	0.003141918	1.2068E-05	0.006858082	3.141917994
303.0	4.24134E-05	55.50828086	9.73711E-06	1.62285E-07	0.003129896	1.20218E-05	0.006870104	3.129896158
304.0	4.22511E-05	55.5082807	9.69985E-06	1.61664E-07	0.00311792	1.19758E-05	0.00688208	3.11792032
305.0	4.20894E-05	55.50828054	9.66273E-06	1.61046E-07	0.00310599	1.193E-05	0.00689401	3.105990305
306.0	4.19284E-05	55.50828037	9.62576E-06	1.60429E-07	0.003094106	1.18844E-05	0.006905894	3.094105937
307.0	4.17679E-05	55.50828021	9.58893E-06	1.59816E-07	0.003082267	1.18389E-05	0.006917733	3.082267043

308.0	4.16081E-05	55.50828005	9.55224E-06	1.59204E-07	0.003070473	1.17936E-05	0.006929527	3.070473447
309.0	4.14489E-05	55.5082799	9.51569E-06	1.58595E-07	0.003058725	1.17485E-05	0.006941275	3.058724977
310.0	4.12903E-05	55.50827974	9.47928E-06	1.57988E-07	0.003047021	1.17035E-05	0.006952979	3.04702146
311.0	4.11323E-05	55.50827958	9.44301E-06	1.57384E-07	0.003035363	1.16587E-05	0.006964637	3.035362723
312.0	4.09749E-05	55.50827942	9.40688E-06	1.56781E-07	0.003023749	1.16141E-05	0.006976251	3.023748597
313.0	4.08182E-05	55.50827926	9.37089E-06	1.56181E-07	0.003012179	1.15697E-05	0.006987821	3.012178909
314.0	4.0662E-05	55.50827911	9.33503E-06	1.55584E-07	0.003000653	1.15254E-05	0.006999347	3.00065349
315.0	4.05064E-05	55.50827895	9.29931E-06	1.54989E-07	0.002989172	1.14813E-05	0.007010828	2.98917217
316.0	4.03514E-05	55.5082788	9.26373E-06	1.54396E-07	0.002977735	1.14374E-05	0.007022265	2.977734781
317.0	4.0197E-05	55.50827864	9.22829E-06	1.53805E-07	0.002966341	1.13936E-05	0.007033659	2.966341154
318.0	4.00432E-05	55.50827849	9.19298E-06	1.53216E-07	0.002954991	1.135E-05	0.007045009	2.954991123
319.0	3.989E-05	55.50827834	9.1578E-06	1.5263E-07	0.002943685	1.13066E-05	0.007056315	2.94368452
320.0	3.97374E-05	55.50827818	9.12276E-06	1.52046E-07	0.002932421	1.12633E-05	0.007067579	2.932421179
321.0	3.95853E-05	55.50827803	9.08785E-06	1.51464E-07	0.002921201	1.12202E-05	0.007078799	2.921200935
322.0	3.94339E-05	55.50827788	9.05308E-06	1.50885E-07	0.002910024	1.11773E-05	0.007089976	2.910023623
323.0	3.9283E-05	55.50827773	9.01844E-06	1.50307E-07	0.002898889	1.11345E-05	0.007101111	2.898889078
324.0	3.91327E-05	55.50827758	8.98394E-06	1.49732E-07	0.002887797	1.10919E-05	0.007112203	2.887797137
325.0	3.89829E-05	55.50827743	8.94956E-06	1.49159E-07	0.002876748	1.10495E-05	0.007123252	2.876747637
326.0	3.88338E-05	55.50827728	8.91532E-06	1.48589E-07	0.00286574	1.10072E-05	0.00713426	2.865740415
327.0	3.86852E-05	55.50827713	8.8812E-06	1.4802E-07	0.002854775	1.09651E-05	0.007145225	2.85477531
328.0	3.85372E-05	55.50827698	8.84722E-06	1.47454E-07	0.002843852	1.09231E-05	0.007156148	2.843852161
329.0	3.83897E-05	55.50827684	8.81337E-06	1.4689E-07	0.002832971	1.08814E-05	0.007167029	2.832970806
330.0	3.82428E-05	55.50827669	8.77965E-06	1.46327E-07	0.002822131	1.08397E-05	0.007177869	2.822131086
331.0	3.80965E-05	55.50827654	8.74605E-06	1.45768E-07	0.002811333	1.07982E-05	0.007188667	2.811332843
332.0	3.79507E-05	55.5082764	8.71259E-06	1.4521E-07	0.002800576	1.07569E-05	0.007199424	2.800575916
333.0	3.78055E-05	55.50827625	8.67925E-06	1.44654E-07	0.00278986	1.07158E-05	0.00721014	2.789860148
334.0	3.76609E-05	55.50827611	8.64604E-06	1.44101E-07	0.002779185	1.06748E-05	0.007220815	2.779185382
335.0	3.75168E-05	55.50827596	8.61296E-06	1.43549E-07	0.002768551	1.06339E-05	0.007231449	2.76855146
336.0	3.73732E-05	55.50827582	8.58001E-06	1.43E-07	0.002757958	1.05932E-05	0.007242042	2.757958227
337.0	3.72302E-05	55.50827568	8.54718E-06	1.42453E-07	0.002747406	1.05527E-05	0.007252594	2.747405526
338.0	3.70878E-05	55.50827553	8.51447E-06	1.41908E-07	0.002736893	1.05123E-05	0.007263107	2.736893203
339.0	3.69459E-05	55.50827539	8.48189E-06	1.41365E-07	0.002726421	1.04721E-05	0.007273579	2.726421103
340.0	3.68045E-05	55.50827525	8.44944E-06	1.40824E-07	0.002715989	1.0432E-05	0.007284011	2.715989072
341.0	3.66637E-05	55.50827511	8.41711E-06	1.40285E-07	0.002705597	1.03921E-05	0.007294403	2.705596957
342.0	3.65234E-05	55.50827497	8.3849E-06	1.39748E-07	0.002695245	1.03524E-05	0.007304755	2.695244604
343.0	3.63836E-05	55.50827483	8.35282E-06	1.39214E-07	0.002684932	1.03127E-05	0.007315068	2.684931863
344.0	3.62444E-05	55.50827469	8.32086E-06	1.38681E-07	0.002674659	1.02733E-05	0.007325341	2.674658582
345.0	3.61057E-05	55.50827455	8.28902E-06	1.3815E-07	0.002664425	1.0234E-05	0.007335575	2.664424608
346.0	3.59676E-05	55.50827441	8.25731E-06	1.37622E-07	0.00265423	1.01948E-05	0.00734577	2.654229793
347.0	3.583E-05	55.50827428	8.22571E-06	1.37095E-07	0.002644074	1.01558E-05	0.007355926	2.644073986
348.0	3.56929E-05	55.50827414	8.19424E-06	1.36571E-07	0.002633957	1.01169E-05	0.007366043	2.633957037
349.0	3.55563E-05	55.508274	8.16289E-06	1.36048E-07	0.002623879	1.00782E-05	0.007376121	2.623878799
350.0	3.54202E-05	55.50827387	8.13165E-06	1.35528E-07	0.002613839	1.00397E-05	0.007386161	2.613839123
351.0	3.52847E-05	55.50827373	8.10054E-06	1.35009E-07	0.002603838	1.00013E-05	0.007396162	2.603837862
352.0	3.51497E-05	55.5082736	8.06954E-06	1.34492E-07	0.002593875	9.96299E-06	0.007406125	2.593874868
353.0	3.50152E-05	55.50827346	8.03867E-06	1.33978E-07	0.00258395	9.92487E-06	0.00741605	2.583949996
354.0	3.48812E-05	55.50827333	8.00791E-06	1.33465E-07	0.002574063	9.8869E-06	0.007425937	2.574063098
355.0	3.47478E-05	55.50827319	7.97727E-06	1.32954E-07	0.002564214	9.84907E-06	0.007435786	2.564214031

356.0	3.46148E-05	55.50827306	7.94674E-06	1.32446E-07	0.002554403	9.81138E-06	0.007445597	2.554402649
357.0	3.44824E-05	55.50827293	7.91634E-06	1.31939E-07	0.002544629	9.77384E-06	0.007455371	2.544628808
358.0	3.43504E-05	55.5082728	7.88605E-06	1.31434E-07	0.002534892	9.73644E-06	0.007465108	2.534892364
359.0	3.4219E-05	55.50827267	7.85587E-06	1.30931E-07	0.002525193	9.69919E-06	0.007474807	2.525193175
360.0	3.40881E-05	55.50827253	7.82582E-06	1.3043E-07	0.002515531	9.66208E-06	0.007484469	2.515531097
361.0	3.39576E-05	55.5082724	7.79587E-06	1.29931E-07	0.002505906	9.62511E-06	0.007494094	2.505905989
362.0	3.38277E-05	55.50827227	7.76604E-06	1.29434E-07	0.002496318	9.58828E-06	0.007503682	2.49631771
363.0	3.36983E-05	55.50827214	7.73633E-06	1.28939E-07	0.002486766	9.55159E-06	0.007513234	2.486766118
364.0	3.35693E-05	55.50827202	7.70673E-06	1.28445E-07	0.002477251	9.51505E-06	0.007522749	2.477251072
365.0	3.34409E-05	55.50827189	7.67724E-06	1.27954E-07	0.002467772	9.47864E-06	0.007532228	2.467772435
366.0	3.33129E-05	55.50827176	7.64786E-06	1.27464E-07	0.00245833	9.44237E-06	0.00754167	2.458330065
367.0	3.31855E-05	55.50827163	7.6186E-06	1.26977E-07	0.002448924	9.40624E-06	0.007551076	2.448923824
368.0	3.30585E-05	55.5082715	7.58945E-06	1.26491E-07	0.002439554	9.37025E-06	0.007560446	2.439553573
369.0	3.2932E-05	55.50827138	7.56041E-06	1.26007E-07	0.002430219	9.3344E-06	0.007569781	2.430219177
370.0	3.2806E-05	55.50827125	7.53148E-06	1.25525E-07	0.00242092	9.29868E-06	0.00757908	2.420920496
371.0	3.26805E-05	55.50827113	7.50266E-06	1.25044E-07	0.002411657	9.2631E-06	0.007588343	2.411657394
372.0	3.25554E-05	55.508271	7.47396E-06	1.24566E-07	0.00240243	9.22766E-06	0.00759757	2.402429735
373.0	3.24309E-05	55.50827088	7.44536E-06	1.24089E-07	0.002393237	9.19235E-06	0.007606763	2.393237385
374.0	3.23068E-05	55.50827075	7.41687E-06	1.23615E-07	0.00238408	9.15718E-06	0.00761592	2.384080206
375.0	3.21832E-05	55.50827063	7.38849E-06	1.23142E-07	0.002374958	9.12214E-06	0.007625042	2.374958065
376.0	3.206E-05	55.50827051	7.36022E-06	1.2267E-07	0.002365871	9.08724E-06	0.007634129	2.365870829
377.0	3.19373E-05	55.50827038	7.33206E-06	1.22201E-07	0.002356818	9.05247E-06	0.007643182	2.356818362
378.0	3.18151E-05	55.50827026	7.30401E-06	1.21733E-07	0.002347801	9.01783E-06	0.007652199	2.347800533
379.0	3.16934E-05	55.50827014	7.27606E-06	1.21268E-07	0.002338817	8.98332E-06	0.007661183	2.338817208
380.0	3.15721E-05	55.50827002	7.24822E-06	1.20804E-07	0.002329868	8.94895E-06	0.007670132	2.329868256
381.0	3.14513E-05	55.5082699	7.22048E-06	1.20341E-07	0.002320954	8.91471E-06	0.007679046	2.320953546
382.0	3.1331E-05	55.50826978	7.19286E-06	1.19881E-07	0.002312073	8.8806E-06	0.007687927	2.312072945
383.0	3.12111E-05	55.50826966	7.16533E-06	1.19422E-07	0.002303226	8.84662E-06	0.007696774	2.303226324
384.0	3.10917E-05	55.50826954	7.13792E-06	1.18965E-07	0.002294414	8.81277E-06	0.007705586	2.294413553
385.0	3.09727E-05	55.50826942	7.11061E-06	1.1851E-07	0.002285635	8.77905E-06	0.007714365	2.285634501
386.0	3.08542E-05	55.5082693	7.0834E-06	1.18057E-07	0.002276889	8.74546E-06	0.007723111	2.276889041
387.0	3.07362E-05	55.50826918	7.0563E-06	1.17605E-07	0.002268177	8.712E-06	0.007731823	2.268177043
388.0	3.06186E-05	55.50826906	7.0293E-06	1.17155E-07	0.002259498	8.67866E-06	0.007740502	2.25949838
389.0	3.05014E-05	55.50826895	7.0024E-06	1.16707E-07	0.002250853	8.64546E-06	0.007749147	2.250852924
390.0	3.03847E-05	55.50826883	6.97561E-06	1.1626E-07	0.002242241	8.61238E-06	0.007757759	2.242240547
391.0	3.02684E-05	55.50826871	6.94892E-06	1.15815E-07	0.002233661	8.57942E-06	0.007766339	2.233661124
392.0	3.01526E-05	55.5082686	6.92233E-06	1.15372E-07	0.002225115	8.5466E-06	0.007774885	2.225114528
393.0	3.00373E-05	55.50826848	6.89584E-06	1.14931E-07	0.002216601	8.51389E-06	0.007783399	2.216600634
394.0	2.99223E-05	55.50826837	6.86946E-06	1.14491E-07	0.002208119	8.48132E-06	0.007791881	2.208119316
395.0	2.98078E-05	55.50826825	6.84317E-06	1.14053E-07	0.00219967	8.44887E-06	0.00780033	2.19967045
396.0	2.96938E-05	55.50826814	6.81699E-06	1.13616E-07	0.002191254	8.41654E-06	0.007808746	2.191253912
397.0	2.95802E-05	55.50826803	6.7909E-06	1.13182E-07	0.00218287	8.38433E-06	0.00781713	2.182869578
398.0	2.9467E-05	55.50826791	6.76492E-06	1.12749E-07	0.002174517	8.35225E-06	0.007825483	2.174517324
399.0	2.93542E-05	55.5082678	6.73904E-06	1.12317E-07	0.002166197	8.3203E-06	0.007833803	2.166197029
400.0	2.92419E-05	55.50826769	6.71325E-06	1.11888E-07	0.002157909	8.28846E-06	0.007842091	2.157908569
401.0	2.913E-05	55.50826758	6.68756E-06	1.11459E-07	0.002149652	8.25675E-06	0.007850348	2.149651823
402.0	2.90186E-05	55.50826746	6.66198E-06	1.11033E-07	0.002141427	8.22515E-06	0.007858573	2.14142667
403.0	2.89075E-05	55.50826735	6.63649E-06	1.10608E-07	0.002133233	8.19368E-06	0.007866767	2.133232989

404.0	2.87969E-05	55.50826724	6.61109E-06	1.10185E-07	0.002125071	8.16233E-06	0.007874929	2.125070658
405.0	2.86867E-05	55.50826713	6.5858E-06	1.09763E-07	0.00211694	8.1311E-06	0.00788306	2.116939559
406.0	2.8577E-05	55.50826702	6.5606E-06	1.09343E-07	0.00210884	8.09999E-06	0.00789116	2.108839572
407.0	2.84676E-05	55.50826691	6.53549E-06	1.08925E-07	0.002100771	8.06899E-06	0.007899229	2.100770578
408.0	2.83587E-05	55.5082668	6.51049E-06	1.08508E-07	0.002092732	8.03812E-06	0.007907268	2.092732458
409.0	2.82502E-05	55.5082667	6.48558E-06	1.08093E-07	0.002084725	8.00736E-06	0.007915275	2.084725094
410.0	2.81421E-05	55.50826659	6.46076E-06	1.07679E-07	0.002076748	7.97673E-06	0.007923252	2.076748368
411.0	2.80344E-05	55.50826648	6.43604E-06	1.07267E-07	0.002068802	7.9462E-06	0.007931198	2.068802163
412.0	2.79272E-05	55.50826637	6.41142E-06	1.06857E-07	0.002060886	7.9158E-06	0.007939114	2.060886363
413.0	2.78203E-05	55.50826627	6.38688E-06	1.06448E-07	0.002053001	7.88551E-06	0.007946999	2.053000851
414.0	2.77139E-05	55.50826616	6.36245E-06	1.06041E-07	0.002045146	7.85534E-06	0.007954854	2.045145511
415.0	2.76078E-05	55.50826605	6.3381E-06	1.05635E-07	0.00203732	7.82528E-06	0.00796268	2.037320227
416.0	2.75022E-05	55.50826595	6.31385E-06	1.05231E-07	0.002029525	7.79534E-06	0.007970475	2.029524885
417.0	2.73969E-05	55.50826584	6.28969E-06	1.04828E-07	0.002021759	7.76551E-06	0.007978241	2.021759371
418.0	2.72921E-05	55.50826574	6.26562E-06	1.04427E-07	0.002014024	7.7358E-06	0.007985976	2.014023569
419.0	2.71877E-05	55.50826563	6.24165E-06	1.04028E-07	0.002006317	7.7062E-06	0.007993683	2.006317367
420.0	2.70837E-05	55.50826553	6.21777E-06	1.03629E-07	0.001998641	7.67672E-06	0.008001359	1.998640651
421.0	2.698E-05	55.50826543	6.19398E-06	1.03233E-07	0.001990993	7.64734E-06	0.008009007	1.990993307
422.0	2.68768E-05	55.50826532	6.17028E-06	1.02838E-07	0.001983375	7.61808E-06	0.008016625	1.983375225
423.0	2.6774E-05	55.50826522	6.14667E-06	1.02444E-07	0.001975786	7.58893E-06	0.008024214	1.975786292
424.0	2.66715E-05	55.50826512	6.12315E-06	1.02052E-07	0.001968226	7.5599E-06	0.008031774	1.968226396
425.0	2.65695E-05	55.50826502	6.09972E-06	1.01662E-07	0.001960695	7.53097E-06	0.008039305	1.960695426
426.0	2.64678E-05	55.50826491	6.07638E-06	1.01273E-07	0.001953193	7.50215E-06	0.008046807	1.953193272
427.0	2.63665E-05	55.50826481	6.05313E-06	1.00886E-07	0.00194572	7.47345E-06	0.00805428	1.945719823
428.0	2.62656E-05	55.50826471	6.02997E-06	1.005E-07	0.001938275	7.44485E-06	0.008061725	1.938274969
429.0	2.61651E-05	55.50826461	6.0069E-06	1.00115E-07	0.001930859	7.41637E-06	0.008069141	1.930858602
430.0	2.6065E-05	55.50826451	5.98391E-06	9.97319E-08	0.001923471	7.38799E-06	0.008076529	1.923470611
431.0	2.59653E-05	55.50826441	5.96102E-06	9.93503E-08	0.001916111	7.35972E-06	0.008083889	1.916110889
432.0	2.5866E-05	55.50826431	5.93821E-06	9.89702E-08	0.001908779	7.33156E-06	0.008091221	1.908779328
433.0	2.5767E-05	55.50826421	5.91549E-06	9.85915E-08	0.001901476	7.30351E-06	0.008098524	1.901475819
434.0	2.56684E-05	55.50826411	5.89285E-06	9.82142E-08	0.0018942	7.27556E-06	0.0081058	1.894200255
435.0	2.55702E-05	55.50826402	5.87031E-06	9.78384E-08	0.001886953	7.24773E-06	0.008113047	1.886952529
436.0	2.54723E-05	55.50826392	5.84785E-06	9.74641E-08	0.001879733	7.21999E-06	0.008120267	1.879732536
437.0	2.53749E-05	55.50826382	5.82547E-06	9.70912E-08	0.00187254	7.19237E-06	0.00812746	1.872540168
438.0	2.52778E-05	55.50826372	5.80318E-06	9.67197E-08	0.001865375	7.16485E-06	0.008134625	1.86537532
439.0	2.51811E-05	55.50826363	5.78098E-06	9.63496E-08	0.001858238	7.13743E-06	0.008141762	1.858237886
440.0	2.50847E-05	55.50826353	5.75886E-06	9.59809E-08	0.001851128	7.11012E-06	0.008148872	1.851127762
441.0	2.49887E-05	55.50826343	5.73682E-06	9.56137E-08	0.001844045	7.08292E-06	0.008155955	1.844044844
442.0	2.48931E-05	55.50826334	5.71487E-06	9.52478E-08	0.001836989	7.05582E-06	0.008163011	1.836989027
443.0	2.47979E-05	55.50826324	5.693E-06	9.48834E-08	0.00182996	7.02882E-06	0.00817004	1.829960207
444.0	2.4703E-05	55.50826315	5.67122E-06	9.45203E-08	0.001822958	7.00193E-06	0.008177042	1.822958282
445.0	2.46085E-05	55.50826305	5.64952E-06	9.41587E-08	0.001815983	6.97513E-06	0.008184017	1.815983147
446.0	2.45143E-05	55.50826296	5.6279E-06	9.37984E-08	0.001809035	6.94845E-06	0.008190965	1.809034702
447.0	2.44205E-05	55.50826287	5.60637E-06	9.34395E-08	0.001802113	6.92186E-06	0.008197887	1.802112843
448.0	2.43271E-05	55.50826277	5.58492E-06	9.3082E-08	0.001795217	6.89537E-06	0.008204783	1.795217469
449.0	2.4234E-05	55.50826268	5.56355E-06	9.27258E-08	0.001788348	6.86899E-06	0.008211652	1.788348479
450.0	2.41413E-05	55.50826259	5.54226E-06	9.2371E-08	0.001781506	6.84271E-06	0.008218494	1.781505771
451.0	2.40489E-05	55.5082625	5.52106E-06	9.20176E-08	0.001774689	6.81653E-06	0.008225311	1.774689246

452.0	2.39569E-05	55.5082624	5.49993E-06	9.16655E-08	0.001767899	6.79044E-06	0.008232101	1.767898802
453.0	2.38652E-05	55.50826231	5.47889E-06	9.13148E-08	0.001761134	6.76446E-06	0.008238866	1.76113434
454.0	2.37739E-05	55.50826222	5.45792E-06	9.09654E-08	0.001754396	6.73858E-06	0.008245604	1.754395762
455.0	2.36829E-05	55.50826213	5.43704E-06	9.06173E-08	0.001747683	6.7128E-06	0.008252317	1.747682966
456.0	2.35923E-05	55.50826204	5.41624E-06	9.02706E-08	0.001740996	6.68711E-06	0.008259004	1.740995856
457.0	2.3502E-05	55.50826195	5.39551E-06	8.99252E-08	0.001734334	6.66152E-06	0.008265666	1.734334332
458.0	2.34121E-05	55.50826186	5.37487E-06	8.95811E-08	0.001727698	6.63603E-06	0.008272302	1.727698298
459.0	2.33225E-05	55.50826177	5.3543E-06	8.92384E-08	0.001721088	6.61064E-06	0.008278912	1.721087654
460.0	2.32333E-05	55.50826168	5.33381E-06	8.88969E-08	0.001714502	6.58535E-06	0.008285498	1.714502305
461.0	2.31444E-05	55.50826159	5.31341E-06	8.85568E-08	0.001707942	6.56015E-06	0.008292058	1.707942153
462.0	2.30558E-05	55.5082615	5.29308E-06	8.82179E-08	0.001701407	6.53505E-06	0.008298593	1.701407102
463.0	2.29676E-05	55.50826141	5.27282E-06	8.78804E-08	0.001694897	6.51005E-06	0.008305103	1.694897056
464.0	2.28797E-05	55.50826133	5.25265E-06	8.75441E-08	0.001688412	6.48514E-06	0.008311588	1.688411919
465.0	2.27922E-05	55.50826124	5.23255E-06	8.72092E-08	0.001681952	6.46032E-06	0.008318048	1.681951596
466.0	2.2705E-05	55.50826115	5.21253E-06	8.68755E-08	0.001675516	6.4356E-06	0.008324484	1.675515992
467.0	2.26181E-05	55.50826106	5.19258E-06	8.65431E-08	0.001669105	6.41098E-06	0.008330895	1.669105012
468.0	2.25316E-05	55.50826098	5.17272E-06	8.62119E-08	0.001662719	6.38645E-06	0.008337281	1.662718562
469.0	2.24454E-05	55.50826089	5.15292E-06	8.5882E-08	0.001656357	6.36201E-06	0.008343643	1.656356549
470.0	2.23595E-05	55.50826081	5.13321E-06	8.55534E-08	0.001650019	6.33767E-06	0.008349981	1.650018879
471.0	2.22739E-05	55.50826072	5.11357E-06	8.52261E-08	0.001643705	6.31342E-06	0.008356295	1.643705458
472.0	2.21887E-05	55.50826063	5.094E-06	8.49E-08	0.001637416	6.28926E-06	0.008362584	1.637416194
473.0	2.21038E-05	55.50826055	5.07451E-06	8.45751E-08	0.001631151	6.2652E-06	0.008368849	1.631150995
474.0	2.20192E-05	55.50826047	5.05509E-06	8.42515E-08	0.00162491	6.24123E-06	0.00837509	1.624909768
475.0	2.1935E-05	55.50826038	5.03575E-06	8.39292E-08	0.001618692	6.21735E-06	0.008381308	1.618692421
476.0	2.1851E-05	55.5082603	5.01648E-06	8.3608E-08	0.001612499	6.19356E-06	0.008387501	1.612498864
477.0	2.17674E-05	55.50826021	4.99729E-06	8.32881E-08	0.001606329	6.16986E-06	0.008393671	1.606329005
478.0	2.16841E-05	55.50826013	4.97817E-06	8.29694E-08	0.001600183	6.14625E-06	0.008399817	1.600182754
479.0	2.16012E-05	55.50826005	4.95912E-06	8.2652E-08	0.00159406	6.12273E-06	0.00840594	1.594060019
480.0	2.15185E-05	55.50825996	4.94014E-06	8.23357E-08	0.001587961	6.09931E-06	0.008412039	1.587960713
481.0	2.14362E-05	55.50825988	4.92124E-06	8.20207E-08	0.001581885	6.07597E-06	0.008418115	1.581884743
482.0	2.13542E-05	55.5082598	4.90241E-06	8.17069E-08	0.001575832	6.05272E-06	0.008424168	1.575832022
483.0	2.12725E-05	55.50825972	4.88365E-06	8.13942E-08	0.001569802	6.02956E-06	0.008430198	1.569802461
484.0	2.11911E-05	55.50825964	4.86497E-06	8.10828E-08	0.001563796	6.00649E-06	0.008436204	1.56379597
485.0	2.111E-05	55.50825956	4.84635E-06	8.07725E-08	0.001557812	5.98351E-06	0.008442188	1.557812462
486.0	2.10292E-05	55.50825948	4.82781E-06	8.04635E-08	0.001551852	5.96061E-06	0.008448148	1.551851848
487.0	2.09487E-05	55.50825939	4.80934E-06	8.01556E-08	0.001545914	5.93781E-06	0.008454086	1.545914041
488.0	2.08686E-05	55.50825931	4.79093E-06	7.98489E-08	0.001539999	5.91509E-06	0.008460001	1.539998954
489.0	2.07887E-05	55.50825923	4.7726E-06	7.95434E-08	0.001534106	5.89245E-06	0.008465894	1.534106499
490.0	2.07092E-05	55.50825916	4.75434E-06	7.9239E-08	0.001528237	5.86991E-06	0.008471763	1.528236591
491.0	2.063E-05	55.50825908	4.73615E-06	7.89358E-08	0.001522389	5.84745E-06	0.008477611	1.522389142
492.0	2.0551E-05	55.508259	4.71803E-06	7.86338E-08	0.001516564	5.82507E-06	0.008483436	1.516564068
493.0	2.04724E-05	55.50825892	4.69998E-06	7.83329E-08	0.001510761	5.80279E-06	0.008489239	1.510761282
494.0	2.03941E-05	55.50825884	4.68199E-06	7.80332E-08	0.001504981	5.78058E-06	0.008495019	1.504980699
495.0	2.0316E-05	55.50825876	4.66408E-06	7.77346E-08	0.001499222	5.75847E-06	0.008500778	1.499222234
496.0	2.02383E-05	55.50825868	4.64623E-06	7.74372E-08	0.001493486	5.73643E-06	0.008506514	1.493485802
497.0	2.01609E-05	55.50825861	4.62845E-06	7.71409E-08	0.001487771	5.71448E-06	0.008512229	1.487771319
498.0	2.00837E-05	55.50825853	4.61074E-06	7.68457E-08	0.001482079	5.69262E-06	0.008517921	1.482078702
499.0	2.00069E-05	55.50825845	4.5931E-06	7.65517E-08	0.001476408	5.67084E-06	0.008523592	1.476407866

500.0	1.99303E-05	55.50825838	4.57553E-06	7.62588E-08	0.001470759	5.64914E-06	0.008529241	1.470758729
501.0	1.98541E-05	55.5082583	4.55802E-06	7.5967E-08	0.001465131	5.62752E-06	0.008534869	1.465131206
502.0	1.97781E-05	55.50825822	4.54058E-06	7.56763E-08	0.001459525	5.60599E-06	0.008540475	1.459525216
503.0	1.97024E-05	55.50825815	4.52321E-06	7.53868E-08	0.001453941	5.58454E-06	0.008546059	1.453940676
504.0	1.9627E-05	55.50825807	4.5059E-06	7.50983E-08	0.001448378	5.56317E-06	0.008551622	1.448377504
505.0	1.95519E-05	55.508258	4.48866E-06	7.4811E-08	0.001442836	5.54189E-06	0.008557164	1.442835619
506.0	1.94771E-05	55.50825792	4.47148E-06	7.45247E-08	0.001437315	5.52068E-06	0.008562685	1.437314938
507.0	1.94026E-05	55.50825785	4.45438E-06	7.42396E-08	0.001431815	5.49956E-06	0.008568185	1.43181538
508.0	1.93284E-05	55.50825777	4.43733E-06	7.39555E-08	0.001426337	5.47851E-06	0.008573663	1.426336866
509.0	1.92544E-05	55.5082577	4.42035E-06	7.36726E-08	0.001420879	5.45755E-06	0.008579121	1.420879313
510.0	1.91807E-05	55.50825763	4.40344E-06	7.33907E-08	0.001415443	5.43667E-06	0.008584557	1.415442643
511.0	1.91073E-05	55.50825755	4.38659E-06	7.31098E-08	0.001410027	5.41587E-06	0.008589973	1.410026775
512.0	1.90342E-05	55.50825748	4.36981E-06	7.28301E-08	0.001404632	5.39515E-06	0.008595368	1.40463163
513.0	1.89614E-05	55.50825741	4.35309E-06	7.25514E-08	0.001399257	5.3745E-06	0.008600743	1.399257128
514.0	1.88888E-05	55.50825734	4.33643E-06	7.22738E-08	0.001393903	5.35394E-06	0.008606097	1.39390319
515.0	1.88166E-05	55.50825726	4.31984E-06	7.19973E-08	0.00138857	5.33345E-06	0.00861143	1.388569738
516.0	1.87446E-05	55.50825719	4.30331E-06	7.17218E-08	0.001383257	5.31304E-06	0.008616743	1.383256693
517.0	1.86728E-05	55.50825712	4.28684E-06	7.14474E-08	0.001377964	5.29272E-06	0.008622036	1.377963977
518.0	1.86014E-05	55.50825705	4.27044E-06	7.1174E-08	0.001372692	5.27246E-06	0.008627308	1.372691512
519.0	1.85302E-05	55.50825698	4.2541E-06	7.09017E-08	0.001367439	5.25229E-06	0.008632561	1.367439222
520.0	1.84593E-05	55.50825691	4.23782E-06	7.06304E-08	0.001362207	5.23219E-06	0.008637793	1.362207028
521.0	1.83887E-05	55.50825683	4.22161E-06	7.03601E-08	0.001356995	5.21217E-06	0.008643005	1.356994854
522.0	1.83183E-05	55.50825676	4.20546E-06	7.00909E-08	0.001351803	5.19223E-06	0.008648197	1.351802623
523.0	1.82482E-05	55.50825669	4.18936E-06	6.98227E-08	0.00134663	5.17236E-06	0.00865337	1.346630259
524.0	1.81784E-05	55.50825662	4.17333E-06	6.95556E-08	0.001341478	5.15257E-06	0.008658522	1.341477686
525.0	1.81089E-05	55.50825656	4.15737E-06	6.92894E-08	0.001336345	5.13286E-06	0.008663655	1.336344828
526.0	1.80396E-05	55.50825649	4.14146E-06	6.90243E-08	0.001331232	5.11322E-06	0.008668768	1.33123161
527.0	1.79706E-05	55.50825642	4.12561E-06	6.87602E-08	0.001326138	5.09365E-06	0.008673862	1.326137956
528.0	1.79018E-05	55.50825635	4.10983E-06	6.84971E-08	0.001321064	5.07416E-06	0.008678936	1.321063793
529.0	1.78333E-05	55.50825628	4.0941E-06	6.8235E-08	0.001316009	5.05475E-06	0.008683991	1.316009044
530.0	1.77651E-05	55.50825621	4.07844E-06	6.79739E-08	0.001310974	5.03541E-06	0.008689026	1.310973636
531.0	1.76971E-05	55.50825614	4.06283E-06	6.77139E-08	0.001305957	5.01614E-06	0.008694043	1.305957495
532.0	1.76294E-05	55.50825608	4.04729E-06	6.74548E-08	0.001300961	4.99695E-06	0.008699039	1.300960547
533.0	1.75619E-05	55.50825601	4.0318E-06	6.71967E-08	0.001295983	4.97783E-06	0.008704017	1.295982718
534.0	1.74947E-05	55.50825594	4.01637E-06	6.69396E-08	0.001291024	4.95878E-06	0.008708976	1.291023937
535.0	1.74278E-05	55.50825587	4.00101E-06	6.66834E-08	0.001286084	4.93981E-06	0.008713916	1.286084129
536.0	1.73611E-05	55.50825581	3.9857E-06	6.64283E-08	0.001281163	4.92091E-06	0.008718837	1.281163222
537.0	1.72947E-05	55.50825574	3.97045E-06	6.61741E-08	0.001276261	4.90208E-06	0.008723739	1.276261143
538.0	1.72285E-05	55.50825567	3.95525E-06	6.59209E-08	0.001271378	4.88332E-06	0.008728622	1.271377822
539.0	1.71626E-05	55.50825561	3.94012E-06	6.56687E-08	0.001266513	4.86464E-06	0.008733487	1.266513185
540.0	1.70969E-05	55.50825554	3.92504E-06	6.54174E-08	0.001261667	4.84602E-06	0.008738333	1.261667162
541.0	1.70315E-05	55.50825548	3.91003E-06	6.51671E-08	0.00125684	4.82748E-06	0.00874316	1.256839681
542.0	1.69663E-05	55.50825541	3.89507E-06	6.49178E-08	0.001252031	4.80901E-06	0.008747969	1.252030671
543.0	1.69014E-05	55.50825535	3.88016E-06	6.46694E-08	0.00124724	4.79061E-06	0.00875276	1.247240062
544.0	1.68367E-05	55.50825528	3.86532E-06	6.44219E-08	0.001242468	4.77228E-06	0.008757532	1.242467782
545.0	1.67723E-05	55.50825522	3.85053E-06	6.41754E-08	0.001237714	4.75402E-06	0.008762286	1.237713763
546.0	1.67081E-05	55.50825515	3.83579E-06	6.39299E-08	0.001232978	4.73583E-06	0.008767022	1.232977935
547.0	1.66442E-05	55.50825509	3.82112E-06	6.36853E-08	0.00122826	4.71771E-06	0.00877174	1.228260226

548.0	1.65805E-05	55.50825503	3.80649E-06	6.34416E-08	0.001223561	4.69966E-06	0.008776439	1.223560569	
549.0	1.65171E-05	55.50825496	3.79193E-06	6.31988E-08	0.001218879	4.68167E-06	0.008781121	1.218878894	
550.0	1.64539E-05	55.5082549	3.77742E-06	6.2957E-08	0.001214215	4.66376E-06	0.008785785	1.214215133	
551.0	1.63909E-05	55.50825484	3.76297E-06	6.27161E-08	0.001209569	4.64592E-06	0.008790431	1.209569216	
552.0	1.63282E-05	55.50825477	3.74857E-06	6.24762E-08	0.001204941	4.62814E-06	0.008795059	1.204941076	
553.0	1.62657E-05	55.50825471	3.73423E-06	6.22371E-08	0.001200331	4.61043E-06	0.008799669	1.200330645	
554.0	1.62035E-05	55.50825465	3.71994E-06	6.1999E-08	0.001195738	4.59279E-06	0.008804262	1.195737854	
555.0	1.61415E-05	55.50825459	3.7057E-06	6.17617E-08	0.001191163	4.57522E-06	0.008808837	1.191162636	
556.0	1.60797E-05	55.50825453	3.69153E-06	6.15254E-08	0.001186605	4.55771E-06	0.008813395	1.186604925	
557.0	1.60182E-05	55.50825446	3.6774E-06	6.129E-08	0.001182065	4.54027E-06	0.008817935	1.182064652	
558.0	1.59569E-05	55.5082544	3.66333E-06	6.10555E-08	0.001177542	4.5229E-06	0.008822458	1.177541752	
559.0	1.58959E-05	55.50825434	3.64931E-06	6.08219E-08	0.001173036	4.50559E-06	0.008826964	1.173036158	
560.0	1.5835E-05	55.50825428	3.63535E-06	6.05892E-08	0.001168548	4.48835E-06	0.008831452	1.168547803	
561.0	1.57745E-05	55.50825422	3.62144E-06	6.03573E-08	0.001164077	4.47118E-06	0.008835923	1.164076622	
562.0	1.57141E-05	55.50825416	3.60758E-06	6.01264E-08	0.001159623	4.45407E-06	0.008840377	1.159622549	
563.0	1.5654E-05	55.5082541	3.59378E-06	5.98963E-08	0.001155186	4.43703E-06	0.008844814	1.155185518	
564.0	1.55941E-05	55.50825404	3.58003E-06	5.96672E-08	0.001150765	4.42005E-06	0.008849235	1.150765465	
565.0	1.55344E-05	55.50825398	3.56633E-06	5.94389E-08	0.001146362	4.40314E-06	0.008853638	1.146362324	
566.0	1.5475E-05	55.50825392	3.55269E-06	5.92114E-08	0.001141976	4.38629E-06	0.008858024	1.141976031	
567.0	1.54158E-05	55.50825386	3.53909E-06	5.89849E-08	0.001137607	4.36951E-06	0.008862393	1.13760652	
568.0	1.53568E-05	55.5082538	3.52555E-06	5.87592E-08	0.001133254	4.35279E-06	0.008866746	1.133253729	
569.0	1.5298E-05	55.50825374	3.51206E-06	5.85343E-08	0.001128918	4.33614E-06	0.008871082	1.128917593	
570.0	1.52395E-05	55.50825369	3.49862E-06	5.83104E-08	0.001124598	4.31955E-06	0.008875402	1.124598048	
571.0	1.51812E-05	55.50825363	3.48524E-06	5.80873E-08	0.001120295	4.30302E-06	0.008879705	1.120295031	
572.0	1.51231E-05	55.50825357	3.4719E-06	5.7865E-08	0.001116008	4.28655E-06	0.008883992	1.116008478	
573.0	1.50652E-05	55.50825351	3.45862E-06	5.76436E-08	0.001111738	4.27015E-06	0.008888262	1.111738327	
574.0	1.50076E-05	55.50825345	3.44538E-06	5.7423E-08	0.001107485	4.25381E-06	0.008892515	1.107484514	
575.0	1.49501E-05	55.5082534	3.4322E-06	5.72033E-08	0.001103247	4.23754E-06	0.008896753	1.103246978	
576.0	1.48929E-05	55.50825334	3.41907E-06	5.69844E-08	0.001099026	4.22132E-06	0.008900974	1.099025656	
577.0	1.4836E-05	55.50825328	3.40598E-06	5.67664E-08	0.00109482	4.20517E-06	0.00890518	1.094820485	
578.0	1.47792E-05	55.50825323	3.39295E-06	5.65492E-08	0.001090631	4.18908E-06	0.008909369	1.090631405	
579.0	1.47226E-05	55.50825317	3.37997E-06	5.63328E-08	0.001086458	4.17305E-06	0.008913542	1.086458353	
580.0	1.46663E-05	55.50825311	3.36704E-06	5.61173E-08	0.001082301	4.15708E-06	0.008917699	1.082301269	
581.0	1.46102E-05	55.50825306	3.35415E-06	5.59026E-08	0.00107816	4.14118E-06	0.00892184	1.078160091	
582.0	1.45543E-05	55.508253	3.34132E-06	5.56887E-08	0.001074035	4.12533E-06	0.008925965	1.074034758	
583.0	1.44986E-05	55.50825294	3.32854E-06	5.54756E-08	0.001069925	4.10955E-06	0.008930075	1.069925209	
584.0	1.44431E-05	55.50825289	3.3158E-06	5.52633E-08	0.001065831	4.09382E-06	0.008934169	1.065831385	
585.0	1.43879E-05	55.50825283	3.30311E-06	5.50519E-08	0.001061753	4.07816E-06	0.008938247	1.061753225	
586.0	1.43328E-05	55.50825278	3.29047E-06	5.48412E-08	0.001057691	4.06256E-06	0.008942309	1.057690669	
587.0	1.4278E-05	55.50825272	3.27788E-06	5.46314E-08	0.001053644	4.04701E-06	0.008946356	1.053643658	
588.0	1.42233E-05	55.50825267	3.26534E-06	5.44224E-08	0.001049612	4.03153E-06	0.008950388	1.049612131	
589.0	1.41689E-05	55.50825262	3.25285E-06	5.42141E-08	0.001045596	4.0161E-06	0.008954404	1.04559603	
590.0	1.41147E-05	55.50825256	3.2404E-06	5.40067E-08	0.001041595	4.00073E-06	0.008958405	1.041595296	
591.0	1.40607E-05	55.50825251	3.228E-06	5.38E-08	0.00103761	3.98543E-06	0.00896239	1.03760987	
592.0	1.40069E-05	55.50825245	3.21565E-06	5.35942E-08	0.00103364	3.97018E-06	0.00896636	1.033639693	
593.0	1.39533E-05	55.5082524	3.20335E-06	5.33891E-08	0.001029685	3.95499E-06	0.008970315	1.029684708	
594.0	1.38999E-05	55.50825235	3.19109E-06	5.31848E-08	0.001025745	3.93985E-06	0.008974255	1.025744855	
595.0	1.38467E-05	55.50825229	3.17888E-06	5.29813E-08	0.00102182	3.92478E-06	0.00897818	1.021820076	

596.0	1.37937E-05	55.50825224	3.16672E-06	5.27786E-08	0.00101791	3.90976E-06	0.00898209	1.017910316
597.0	1.3741E-05	55.50825219	3.1546E-06	5.25767E-08	0.001014016	3.8948E-06	0.008985984	1.014015515
598.0	1.36884E-05	55.50825213	3.14253E-06	5.23755E-08	0.001010136	3.8799E-06	0.008989864	1.010135616
599.0	1.3636E-05	55.50825208	3.13051E-06	5.21751E-08	0.001006271	3.86505E-06	0.008993729	1.006270563
600.0	1.35838E-05	55.50825203	3.11853E-06	5.19755E-08	0.00100242	3.85026E-06	0.00899758	1.002420299
601.0	1.35319E-05	55.50825198	3.1066E-06	5.17766E-08	0.000998585	3.83553E-06	0.009001415	0.998584767
602.0	1.34801E-05	55.50825193	3.09471E-06	5.15785E-08	0.000994764	3.82086E-06	0.009005236	0.994763911
603.0	1.34285E-05	55.50825187	3.08287E-06	5.13811E-08	0.000990958	3.80624E-06	0.009009042	0.990957675
604.0	1.33771E-05	55.50825182	3.07107E-06	5.11845E-08	0.000987166	3.79167E-06	0.009012834	0.987166002
605.0	1.33259E-05	55.50825177	3.05932E-06	5.09887E-08	0.000983389	3.77716E-06	0.009016611	0.983388837
606.0	1.3275E-05	55.50825172	3.04761E-06	5.07936E-08	0.000979626	3.76271E-06	0.009020374	0.979626125
607.0	1.32242E-05	55.50825167	3.03595E-06	5.05992E-08	0.000975878	3.74832E-06	0.009024122	0.975877809
608.0	1.31736E-05	55.50825162	3.02434E-06	5.04056E-08	0.000972144	3.73397E-06	0.009027856	0.972143836
609.0	1.31232E-05	55.50825157	3.01277E-06	5.02128E-08	0.000968424	3.71969E-06	0.009031576	0.96842415
610.0	1.30729E-05	55.50825152	3.00124E-06	5.00206E-08	0.000964719	3.70545E-06	0.009035281	0.964718697
611.0	1.30229E-05	55.50825147	2.98975E-06	4.98292E-08	0.000961027	3.69128E-06	0.009038973	0.961027421
612.0	1.29731E-05	55.50825142	2.97831E-06	4.96386E-08	0.00095735	3.67715E-06	0.00904265	0.95735027
613.0	1.29235E-05	55.50825137	2.96692E-06	4.94486E-08	0.000953687	3.66308E-06	0.009046313	0.953687188
614.0	1.2874E-05	55.50825132	2.95557E-06	4.92594E-08	0.000950038	3.64907E-06	0.009049962	0.950038122
615.0	1.28247E-05	55.50825127	2.94426E-06	4.9071E-08	0.000946403	3.6351E-06	0.009053597	0.946403019
616.0	1.27757E-05	55.50825122	2.93299E-06	4.88832E-08	0.000942782	3.62119E-06	0.009057218	0.942781824
617.0	1.27268E-05	55.50825117	2.92177E-06	4.86962E-08	0.000939174	3.60734E-06	0.009060826	0.939174485
618.0	1.26781E-05	55.50825112	2.91059E-06	4.85098E-08	0.000935581	3.59354E-06	0.009064419	0.935580949
619.0	1.26296E-05	55.50825108	2.89945E-06	4.83242E-08	0.000932001	3.57979E-06	0.009067999	0.932001163
620.0	1.25813E-05	55.50825103	2.88836E-06	4.81393E-08	0.000928435	3.56609E-06	0.009071565	0.928435073
621.0	1.25331E-05	55.50825098	2.87731E-06	4.79551E-08	0.000924883	3.55244E-06	0.009075117	0.924882629
622.0	1.24852E-05	55.50825093	2.8663E-06	4.77716E-08	0.000921344	3.53885E-06	0.009078656	0.921343777
623.0	1.24374E-05	55.50825088	2.85533E-06	4.75889E-08	0.000917818	3.52531E-06	0.009082182	0.917818466
624.0	1.23898E-05	55.50825084	2.84441E-06	4.74068E-08	0.000914307	3.51182E-06	0.009085693	0.914306644
625.0	1.23424E-05	55.50825079	2.83352E-06	4.72254E-08	0.000910808	3.49839E-06	0.009089192	0.910808259
626.0	1.22952E-05	55.50825074	2.82268E-06	4.70447E-08	0.000907323	3.485E-06	0.009092677	0.907323259
627.0	1.22481E-05	55.50825069	2.81188E-06	4.68647E-08	0.000903852	3.47166E-06	0.009096148	0.903851595
628.0	1.22013E-05	55.50825065	2.80112E-06	4.66854E-08	0.000900393	3.45838E-06	0.009099607	0.900393213
629.0	1.21546E-05	55.5082506	2.7904E-06	4.65067E-08	0.000896948	3.44515E-06	0.009103052	0.896948065
630.0	1.21081E-05	55.50825055	2.77973E-06	4.63288E-08	0.000893516	3.43197E-06	0.009106484	0.893516098
631.0	1.20617E-05	55.50825051	2.76909E-06	4.61515E-08	0.000890097	3.41883E-06	0.009109903	0.890097263
632.0	1.20156E-05	55.50825046	2.7585E-06	4.59749E-08	0.000886692	3.40575E-06	0.009113308	0.88669151
633.0	1.19696E-05	55.50825042	2.74794E-06	4.5799E-08	0.000883299	3.39272E-06	0.009116701	0.883298788
634.0	1.19238E-05	55.50825037	2.73743E-06	4.56238E-08	0.000879919	3.37974E-06	0.009120081	0.879919047
635.0	1.18782E-05	55.50825032	2.72695E-06	4.54492E-08	0.000876552	3.36681E-06	0.009123448	0.876552238
636.0	1.18327E-05	55.50825028	2.71652E-06	4.52753E-08	0.000873198	3.35393E-06	0.009126802	0.873198312
637.0	1.17875E-05	55.50825023	2.70612E-06	4.51021E-08	0.000869857	3.34109E-06	0.009130143	0.869857218
638.0	1.17424E-05	55.50825019	2.69577E-06	4.49295E-08	0.000866529	3.32831E-06	0.009133471	0.866528909
639.0	1.16974E-05	55.50825014	2.68545E-06	4.47576E-08	0.000863213	3.31557E-06	0.009136787	0.863213334
640.0	1.16527E-05	55.5082501	2.67518E-06	4.45863E-08	0.00085991	3.30289E-06	0.00914009	0.859910446
641.0	1.16081E-05	55.50825005	2.66494E-06	4.44157E-08	0.00085662	3.29025E-06	0.00914338	0.856620195
642.0	1.15637E-05	55.50825001	2.65475E-06	4.42458E-08	0.000853343	3.27766E-06	0.009146657	0.853342534
643.0	1.15194E-05	55.50824997	2.64459E-06	4.40765E-08	0.000850077	3.26512E-06	0.009149923	0.850077415

644.0	1.14754E-05	55.50824992	2.63447E-06	4.39078E-08	0.000846825	3.25263E-06	0.009153175	0.846824788	
645.0	1.14315E-05	55.50824988	2.62439E-06	4.37398E-08	0.000843585	3.24018E-06	0.009156415	0.843584607	
646.0	1.13877E-05	55.50824983	2.61435E-06	4.35725E-08	0.000840357	3.22778E-06	0.009159643	0.840356823	
647.0	1.13441E-05	55.50824979	2.60435E-06	4.34058E-08	0.000837141	3.21543E-06	0.009162859	0.83714139	
648.0	1.13007E-05	55.50824975	2.59438E-06	4.32397E-08	0.000833938	3.20313E-06	0.009166062	0.83393826	
649.0	1.12575E-05	55.5082497	2.58445E-06	4.30742E-08	0.000830747	3.19087E-06	0.009169253	0.830747387	
650.0	1.12144E-05	55.50824966	2.57456E-06	4.29094E-08	0.000827569	3.17866E-06	0.009172431	0.827568722	
651.0	1.11715E-05	55.50824962	2.56471E-06	4.27452E-08	0.000824402	3.1665E-06	0.009175598	0.82440222	
652.0	1.11288E-05	55.50824957	2.5549E-06	4.25817E-08	0.000821248	3.15439E-06	0.009178752	0.821247833	
653.0	1.10862E-05	55.50824953	2.54512E-06	4.24187E-08	0.000818106	3.14232E-06	0.009181894	0.818105516	
654.0	1.10438E-05	55.50824949	2.53539E-06	4.22564E-08	0.000814975	3.13029E-06	0.009185025	0.814975223	
655.0	1.10015E-05	55.50824945	2.52569E-06	4.20948E-08	0.000811857	3.11832E-06	0.009188143	0.811856907	
656.0	1.09594E-05	55.50824941	2.51602E-06	4.19337E-08	0.000808751	3.10638E-06	0.009191249	0.808750522	
657.0	1.09175E-05	55.50824936	2.50639E-06	4.17732E-08	0.000805656	3.0945E-06	0.009194344	0.805656023	
658.0	1.08757E-05	55.50824932	2.4968E-06	4.16134E-08	0.000802573	3.08266E-06	0.009197427	0.802573365	
659.0	1.08341E-05	55.50824928	2.48725E-06	4.14542E-08	0.000799503	3.07086E-06	0.009200497	0.799502502	
660.0	1.07926E-05	55.50824924	2.47773E-06	4.12956E-08	0.000796443	3.05911E-06	0.009203557	0.796443389	
661.0	1.07513E-05	55.5082492	2.46825E-06	4.11376E-08	0.000793396	3.04741E-06	0.009206604	0.79339598	
662.0	1.07102E-05	55.50824916	2.45881E-06	4.09802E-08	0.00079036	3.03575E-06	0.00920964	0.790360232	
663.0	1.06692E-05	55.50824912	2.4494E-06	4.08233E-08	0.000787336	3.02413E-06	0.009212664	0.7873361	
664.0	1.06284E-05	55.50824907	2.44003E-06	4.06671E-08	0.000784324	3.01256E-06	0.009215676	0.784323539	
665.0	1.05877E-05	55.50824903	2.43069E-06	4.05115E-08	0.000781323	3.00103E-06	0.009218677	0.781322504	
666.0	1.05472E-05	55.50824899	2.42139E-06	4.03565E-08	0.000778333	2.98955E-06	0.009221667	0.778332952	
667.0	1.05069E-05	55.50824895	2.41213E-06	4.02021E-08	0.000775355	2.97811E-06	0.009224645	0.77535484	
668.0	1.04667E-05	55.50824891	2.4029E-06	4.00483E-08	0.000772388	2.96672E-06	0.009227612	0.772388122	
669.0	1.04266E-05	55.50824887	2.3937E-06	3.98951E-08	0.000769433	2.95537E-06	0.009230567	0.769432756	
670.0	1.03867E-05	55.50824883	2.38454E-06	3.97424E-08	0.000766489	2.94406E-06	0.009233511	0.766488697	
671.0	1.0347E-05	55.50824879	2.37542E-06	3.95903E-08	0.000763556	2.93279E-06	0.009236444	0.763555904	
672.0	1.03074E-05	55.50824875	2.36633E-06	3.94389E-08	0.000760634	2.92157E-06	0.009239366	0.760634332	
673.0	1.02679E-05	55.50824871	2.35728E-06	3.9288E-08	0.000757724	2.91039E-06	0.009242276	0.757723939	
674.0	1.02287E-05	55.50824867	2.34826E-06	3.91376E-08	0.000754825	2.89926E-06	0.009245175	0.754824682	
675.0	1.01895E-05	55.50824864	2.33927E-06	3.89879E-08	0.000751937	2.88816E-06	0.009248063	0.751936518	
676.0	1.01505E-05	55.5082486	2.33032E-06	3.88387E-08	0.000749059	2.87711E-06	0.009250941	0.749059405	
677.0	1.01117E-05	55.50824856	2.32141E-06	3.86901E-08	0.000746193	2.8661E-06	0.009253807	0.746193301	
678.0	1.0073E-05	55.50824852	2.31252E-06	3.85421E-08	0.000743338	2.85514E-06	0.009256662	0.743338163	
679.0	1.00345E-05	55.50824848	2.30368E-06	3.83946E-08	0.000740494	2.84421E-06	0.009259506	0.74049395	
680.0	9.99607E-06	55.50824844	2.29486E-06	3.82477E-08	0.000737661	2.83333E-06	0.009262339	0.737660619	
681.0	9.95782E-06	55.5082484	2.28608E-06	3.81013E-08	0.000734838	2.82249E-06	0.009265162	0.73483813	
682.0	9.91972E-06	55.50824837	2.27733E-06	3.79555E-08	0.000732026	2.81169E-06	0.009267974	0.73202644	
683.0	9.88177E-06	55.50824833	2.26862E-06	3.78103E-08	0.000729226	2.80093E-06	0.009270774	0.729225508	
684.0	9.84396E-06	55.50824829	2.25994E-06	3.76656E-08	0.000726435	2.79021E-06	0.009273565	0.726435294	
685.0	9.80629E-06	55.50824825	2.25129E-06	3.75215E-08	0.000723656	2.77954E-06	0.009276344	0.723655756	
686.0	9.76877E-06	55.50824821	2.24268E-06	3.7378E-08	0.000720887	2.7689E-06	0.009279113	0.720886853	
687.0	9.73139E-06	55.50824818	2.2341E-06	3.72349E-08	0.000718129	2.75831E-06	0.009281871	0.718128544	
688.0	9.69416E-06	55.50824814	2.22555E-06	3.70925E-08	0.000715381	2.74775E-06	0.009284619	0.71538079	
689.0	9.65706E-06	55.5082481	2.21703E-06	3.69505E-08	0.000712644	2.73724E-06	0.009287356	0.712643549	
690.0	9.62011E-06	55.50824807	2.20855E-06	3.68092E-08	0.000709917	2.72677E-06	0.009290083	0.709916782	
691.0	9.5833E-06	55.50824803	2.2001E-06	3.66683E-08	0.0007072	2.71633E-06	0.0092928	0.707200448	

692.0	9.54664E-06	55.50824799	2.19168E-06	3.6528E-08	0.000704495	2.70594E-06	0.009295505	0.704494507	
693.0	9.51011E-06	55.50824796	2.18329E-06	3.63882E-08	0.000701799	2.69559E-06	0.009298201	0.70179892	
694.0	9.47372E-06	55.50824792	2.17494E-06	3.6249E-08	0.000699114	2.68527E-06	0.009300886	0.699113648	
695.0	9.43747E-06	55.50824788	2.16662E-06	3.61103E-08	0.000696439	2.675E-06	0.009303561	0.696438649	
696.0	9.40136E-06	55.50824785	2.15833E-06	3.59722E-08	0.000693774	2.66476E-06	0.009306226	0.693773886	
697.0	9.36539E-06	55.50824781	2.15007E-06	3.58345E-08	0.000691119	2.65457E-06	0.009308881	0.69111932	
698.0	9.32955E-06	55.50824778	2.14184E-06	3.56974E-08	0.000688475	2.64441E-06	0.009311525	0.68847491	
699.0	9.29386E-06	55.50824774	2.13365E-06	3.55608E-08	0.000685841	2.63429E-06	0.009314159	0.685840618	
700.0	9.2583E-06	55.5082477	2.12548E-06	3.54247E-08	0.000683216	2.62421E-06	0.009316784	0.683216406	
701.0	9.22287E-06	55.50824767	2.11735E-06	3.52892E-08	0.000680602	2.61417E-06	0.009319398	0.680602235	
702.0	9.18758E-06	55.50824763	2.10925E-06	3.51542E-08	0.000677998	2.60417E-06	0.009322002	0.677998067	
703.0	9.15243E-06	55.5082476	2.10118E-06	3.50197E-08	0.000675404	2.5942E-06	0.009324596	0.675403862	
704.0	9.11741E-06	55.50824756	2.09314E-06	3.48857E-08	0.00067282	2.58428E-06	0.00932718	0.672819584	
705.0	9.08252E-06	55.50824753	2.08513E-06	3.47522E-08	0.000670245	2.57439E-06	0.009329755	0.670245194	
706.0	9.04777E-06	55.50824749	2.07715E-06	3.46192E-08	0.000667681	2.56454E-06	0.009332319	0.667680654	
707.0	9.01315E-06	55.50824746	2.06921E-06	3.44868E-08	0.000665126	2.55473E-06	0.009334874	0.665125927	
708.0	8.97866E-06	55.50824742	2.06129E-06	3.43548E-08	0.000662581	2.54495E-06	0.009337419	0.662580975	
709.0	8.94431E-06	55.50824739	2.0534E-06	3.42233E-08	0.000660046	2.53521E-06	0.009339954	0.660045761	
710.0	8.91009E-06	55.50824736	2.04554E-06	3.40924E-08	0.00065752	2.52551E-06	0.00934248	0.657520247	
711.0	8.87599E-06	55.50824732	2.03772E-06	3.3962E-08	0.000655004	2.51585E-06	0.009344996	0.655004397	
712.0	8.84203E-06	55.50824729	2.02992E-06	3.3832E-08	0.000652498	2.50622E-06	0.009347502	0.652498172	
713.0	8.8082E-06	55.50824725	2.02215E-06	3.37026E-08	0.000650002	2.49663E-06	0.009349998	0.650001537	
714.0	8.7745E-06	55.50824722	2.01442E-06	3.35736E-08	0.000647514	2.48708E-06	0.009352486	0.647514455	
715.0	8.74092E-06	55.50824719	2.00671E-06	3.34451E-08	0.000645037	2.47757E-06	0.009354963	0.64503689	
716.0	8.70748E-06	55.50824715	1.99903E-06	3.33172E-08	0.000642569	2.46809E-06	0.009357431	0.642568804	
717.0	8.67416E-06	55.50824712	1.99138E-06	3.31897E-08	0.00064011	2.45864E-06	0.00935989	0.640110162	
718.0	8.64097E-06	55.50824709	1.98376E-06	3.30627E-08	0.000637661	2.44923E-06	0.009362339	0.637660927	
719.0	8.60791E-06	55.50824705	1.97617E-06	3.29362E-08	0.000635221	2.43986E-06	0.009364779	0.635221063	
720.0	8.57497E-06	55.50824702	1.96861E-06	3.28102E-08	0.000632791	2.43053E-06	0.009367209	0.632790535	
721.0	8.54216E-06	55.50824699	1.96108E-06	3.26846E-08	0.000630369	2.42123E-06	0.009369631	0.630369307	
722.0	8.50948E-06	55.50824696	1.95357E-06	3.25596E-08	0.000627957	2.41196E-06	0.009372043	0.627957344	
723.0	8.47692E-06	55.50824692	1.9461E-06	3.2435E-08	0.000625555	2.40273E-06	0.009374445	0.625554609	
724.0	8.44448E-06	55.50824689	1.93865E-06	3.23109E-08	0.000623161	2.39354E-06	0.009376839	0.623161067	
725.0	8.41217E-06	55.50824686	1.93123E-06	3.21872E-08	0.000620777	2.38438E-06	0.009379223	0.620776684	
726.0	8.37998E-06	55.50824683	1.92385E-06	3.20641E-08	0.000618401	2.37526E-06	0.009381599	0.618401425	
727.0	8.34792E-06	55.50824679	1.91648E-06	3.19414E-08	0.000616035	2.36617E-06	0.009383965	0.616035253	
728.0	8.31598E-06	55.50824676	1.90915E-06	3.18192E-08	0.000613678	2.35712E-06	0.009386322	0.613678135	
729.0	8.28416E-06	55.50824673	1.90185E-06	3.16974E-08	0.00061133	2.3481E-06	0.00938867	0.611330037	
730.0	8.25246E-06	55.5082467	1.89457E-06	3.15762E-08	0.000608991	2.33911E-06	0.009391009	0.608990922	
731.0	8.22089E-06	55.50824667	1.88732E-06	3.14553E-08	0.000606661	2.33016E-06	0.009393339	0.606660758	
732.0	8.18943E-06	55.50824664	1.8801E-06	3.1335E-08	0.00060434	2.32125E-06	0.00939566	0.60433951	
733.0	8.1581E-06	55.5082466	1.87291E-06	3.12151E-08	0.000602027	2.31237E-06	0.009397973	0.602027143	
734.0	8.12688E-06	55.50824657	1.86574E-06	3.10956E-08	0.000599724	2.30352E-06	0.009400276	0.599723624	
735.0	8.09579E-06	55.50824654	1.8586E-06	3.09767E-08	0.000597429	2.29471E-06	0.009402571	0.597428919	
736.0	8.06481E-06	55.50824651	1.85149E-06	3.08581E-08	0.000595143	2.28592E-06	0.009404857	0.595142994	
737.0	8.03395E-06	55.50824648	1.8444E-06	3.07401E-08	0.000592866	2.27718E-06	0.009407134	0.592865816	
738.0	8.00321E-06	55.50824645	1.83735E-06	3.06225E-08	0.000590597	2.26847E-06	0.009409403	0.590597351	
739.0	7.97259E-06	55.50824642	1.83032E-06	3.05053E-08	0.000588338	2.25979E-06	0.009411662	0.588337565	

740.0	7.94208E-06	55.50824639	1.82331E-06	3.03886E-08	0.000586086	2.25114E-06	0.009413914	0.586086426	
741.0	7.91169E-06	55.50824636	1.81634E-06	3.02723E-08	0.000583844	2.24253E-06	0.009416156	0.583843901	
742.0	7.88142E-06	55.50824633	1.80939E-06	3.01565E-08	0.00058161	2.23394E-06	0.00941839	0.581609956	
743.0	7.85127E-06	55.5082463	1.80246E-06	3.00411E-08	0.000579385	2.2254E-06	0.009420615	0.579384559	
744.0	7.82122E-06	55.50824627	1.79557E-06	2.99261E-08	0.000577168	2.21688E-06	0.009422832	0.577167677	
745.0	7.7913E-06	55.50824624	1.7887E-06	2.98116E-08	0.000574959	2.2084E-06	0.009425041	0.574959277	
746.0	7.76149E-06	55.50824621	1.78185E-06	2.96975E-08	0.000572759	2.19995E-06	0.009427241	0.572759327	
747.0	7.73179E-06	55.50824618	1.77504E-06	2.95839E-08	0.000570568	2.19153E-06	0.009429432	0.570567795	
748.0	7.70221E-06	55.50824615	1.76824E-06	2.94707E-08	0.000568385	2.18315E-06	0.009431615	0.568384648	
749.0	7.67273E-06	55.50824612	1.76148E-06	2.9358E-08	0.00056621	2.17479E-06	0.00943379	0.566209854	
750.0	7.64338E-06	55.50824609	1.75474E-06	2.92456E-08	0.000564043	2.16647E-06	0.009435957	0.564043382	
751.0	7.61413E-06	55.50824606	1.74802E-06	2.91337E-08	0.000561885	2.15818E-06	0.009438115	0.561885199	
752.0	7.585E-06	55.50824603	1.74134E-06	2.90223E-08	0.000559735	2.14992E-06	0.009440265	0.559735274	
753.0	7.55597E-06	55.508246	1.73467E-06	2.89112E-08	0.000557594	2.1417E-06	0.009442406	0.557593575	
754.0	7.52706E-06	55.50824597	1.72804E-06	2.88006E-08	0.00055546	2.1335E-06	0.00944454	0.555460071	
755.0	7.49826E-06	55.50824594	1.72142E-06	2.86904E-08	0.000553335	2.12534E-06	0.009446665	0.553334731	
756.0	7.46957E-06	55.50824592	1.71484E-06	2.85806E-08	0.000551218	2.11721E-06	0.009448782	0.551217522	
757.0	7.44099E-06	55.50824589	1.70828E-06	2.84713E-08	0.000549108	2.10911E-06	0.009450892	0.549108415	
758.0	7.41252E-06	55.50824586	1.70174E-06	2.83623E-08	0.000547007	2.10104E-06	0.009452993	0.547007377	
759.0	7.38416E-06	55.50824583	1.69523E-06	2.82538E-08	0.000544914	2.093E-06	0.009455086	0.544914379	
760.0	7.3559E-06	55.5082458	1.68874E-06	2.81457E-08	0.000542829	2.08499E-06	0.009457171	0.542829389	
761.0	7.32776E-06	55.50824577	1.68228E-06	2.8038E-08	0.000540752	2.07701E-06	0.009459248	0.540752377	
762.0	7.29972E-06	55.50824575	1.67584E-06	2.79307E-08	0.000538683	2.06907E-06	0.009461317	0.538683312	
763.0	7.27179E-06	55.50824572	1.66943E-06	2.78238E-08	0.000536622	2.06115E-06	0.009463378	0.536622163	
764.0	7.24397E-06	55.50824569	1.66304E-06	2.77174E-08	0.000534569	2.05326E-06	0.009465431	0.534568902	
765.0	7.21625E-06	55.50824566	1.65668E-06	2.76113E-08	0.000532523	2.04541E-06	0.009467477	0.532523496	
766.0	7.18864E-06	55.50824563	1.65034E-06	2.75057E-08	0.000530486	2.03758E-06	0.009469514	0.530485917	
767.0	7.16113E-06	55.50824561	1.64403E-06	2.74004E-08	0.000528456	2.02978E-06	0.009471544	0.528456134	
768.0	7.13373E-06	55.50824558	1.63774E-06	2.72956E-08	0.000526434	2.02202E-06	0.009473566	0.526434118	
769.0	7.10644E-06	55.50824555	1.63147E-06	2.71911E-08	0.00052442	2.01428E-06	0.00947558	0.524419839	
770.0	7.07924E-06	55.50824553	1.62523E-06	2.70871E-08	0.000522413	2.00657E-06	0.009477587	0.522413266	
771.0	7.05216E-06	55.5082455	1.61901E-06	2.69835E-08	0.000520414	1.99889E-06	0.009479586	0.520414372	
772.0	7.02517E-06	55.50824547	1.61281E-06	2.68802E-08	0.000518423	1.99125E-06	0.009481577	0.518423125	
773.0	6.99829E-06	55.50824544	1.60664E-06	2.67774E-08	0.000516439	1.98363E-06	0.009483561	0.516439498	
774.0	6.97152E-06	55.50824542	1.60049E-06	2.66749E-08	0.000514463	1.97604E-06	0.009485537	0.514463461	
775.0	6.94484E-06	55.50824539	1.59437E-06	2.65728E-08	0.000512495	1.96848E-06	0.009487505	0.512494984	
776.0	6.91827E-06	55.50824536	1.58827E-06	2.64712E-08	0.000510534	1.96094E-06	0.009489466	0.51053404	
777.0	6.8918E-06	55.50824534	1.58219E-06	2.63699E-08	0.000508581	1.95344E-06	0.009491419	0.508580598	
778.0	6.86543E-06	55.50824531	1.57614E-06	2.6269E-08	0.000506635	1.94597E-06	0.009493365	0.506634631	
779.0	6.83916E-06	55.50824529	1.57011E-06	2.61685E-08	0.000504696	1.93852E-06	0.009495304	0.50469611	
780.0	6.81299E-06	55.50824526	1.5641E-06	2.60683E-08	0.000502765	1.9311E-06	0.009497235	0.502765006	
781.0	6.78692E-06	55.50824523	1.55812E-06	2.59686E-08	0.000500841	1.92372E-06	0.009499159	0.500841291	
782.0	6.76095E-06	55.50824521	1.55215E-06	2.58692E-08	0.000498925	1.91635E-06	0.009501075	0.498924936	
783.0	6.73508E-06	55.50824518	1.54622E-06	2.57703E-08	0.000497016	1.90902E-06	0.009502984	0.497015915	
784.0	6.70931E-06	55.50824516	1.5403E-06	2.56717E-08	0.000495114	1.90172E-06	0.009504886	0.495114197	
785.0	6.68364E-06	55.50824513	1.53441E-06	2.55734E-08	0.00049322	1.89444E-06	0.00950678	0.493219756	
786.0	6.65807E-06	55.5082451	1.52853E-06	2.54756E-08	0.000491333	1.88719E-06	0.009508667	0.491332564	
787.0	6.63259E-06	55.50824508	1.52269E-06	2.53781E-08	0.000489453	1.87997E-06	0.009510547	0.489452592	

788.0	6.60722E-06	55.50824505	1.51686E-06	2.5281E-08	0.00048758	1.87278E-06	0.00951242	0.487579814	
789.0	6.58193E-06	55.50824503	1.51106E-06	2.51843E-08	0.000485714	1.86561E-06	0.009514286	0.485714202	
790.0	6.55675E-06	55.508245	1.50527E-06	2.50879E-08	0.000483856	1.85847E-06	0.009516144	0.483855728	
791.0	6.53166E-06	55.50824498	1.49951E-06	2.49919E-08	0.000482004	1.85136E-06	0.009517996	0.482004365	
792.0	6.50667E-06	55.50824495	1.49378E-06	2.48963E-08	0.00048016	1.84428E-06	0.00951984	0.480160086	
793.0	6.48177E-06	55.50824493	1.48806E-06	2.4801E-08	0.000478323	1.83722E-06	0.009521677	0.478322863	
794.0	6.45697E-06	55.5082449	1.48237E-06	2.47061E-08	0.000476493	1.83019E-06	0.009523507	0.47649267	
795.0	6.43227E-06	55.50824488	1.4767E-06	2.46116E-08	0.000474669	1.82319E-06	0.009525331	0.47466948	
796.0	6.40766E-06	55.50824485	1.47105E-06	2.45174E-08	0.000472853	1.81621E-06	0.009527147	0.472853266	
797.0	6.38314E-06	55.50824483	1.46542E-06	2.44236E-08	0.000471044	1.80926E-06	0.009528956	0.471044002	
798.0	6.35871E-06	55.5082448	1.45981E-06	2.43302E-08	0.000469242	1.80234E-06	0.009530758	0.46924166	
799.0	6.33438E-06	55.50824478	1.45422E-06	2.42371E-08	0.000467446	1.79545E-06	0.009532554	0.467446214	
800.0	6.31015E-06	55.50824476	1.44866E-06	2.41443E-08	0.000465658	1.78858E-06	0.009534342	0.465657638	
801.0	6.286E-06	55.50824473	1.44312E-06	2.40519E-08	0.000463876	1.78173E-06	0.009536124	0.463875906	
802.0	6.26195E-06	55.50824471	1.4376E-06	2.39599E-08	0.000462101	1.77491E-06	0.009537899	0.462100991	
803.0	6.23799E-06	55.50824468	1.43209E-06	2.38682E-08	0.000460333	1.76812E-06	0.009539667	0.460332868	
804.0	6.21412E-06	55.50824466	1.42661E-06	2.37769E-08	0.000458572	1.76136E-06	0.009541428	0.45857151	
805.0	6.19035E-06	55.50824464	1.42116E-06	2.36859E-08	0.000456817	1.75462E-06	0.009543183	0.456816891	
806.0	6.16666E-06	55.50824461	1.41572E-06	2.35953E-08	0.000455069	1.74791E-06	0.009544931	0.455068986	
807.0	6.14306E-06	55.50824459	1.4103E-06	2.3505E-08	0.000453328	1.74122E-06	0.009546672	0.453327769	
808.0	6.11956E-06	55.50824457	1.40491E-06	2.34151E-08	0.000451593	1.73455E-06	0.009548407	0.451593214	
809.0	6.09614E-06	55.50824454	1.39953E-06	2.33255E-08	0.000449865	1.72792E-06	0.009550135	0.449865296	
810.0	6.07282E-06	55.50824452	1.39417E-06	2.32362E-08	0.000448144	1.72131E-06	0.009551856	0.44814399	
811.0	6.04958E-06	55.5082445	1.38884E-06	2.31473E-08	0.000446429	1.71472E-06	0.009553571	0.446429269	
812.0	6.02644E-06	55.50824447	1.38353E-06	2.30588E-08	0.000444721	1.70816E-06	0.009555279	0.44472111	
813.0	6.00338E-06	55.50824445	1.37823E-06	2.29705E-08	0.000443019	1.70162E-06	0.009556981	0.443019487	
814.0	5.98041E-06	55.50824443	1.37296E-06	2.28827E-08	0.000441324	1.69511E-06	0.009558676	0.441324374	
815.0	5.95752E-06	55.5082444	1.36771E-06	2.27951E-08	0.000439636	1.68863E-06	0.009560364	0.439635748	
816.0	5.93473E-06	55.50824438	1.36247E-06	2.27079E-08	0.000437954	1.68217E-06	0.009562046	0.437953582	
817.0	5.91202E-06	55.50824436	1.35726E-06	2.2621E-08	0.000436278	1.67573E-06	0.009563722	0.436277853	
818.0	5.8894E-06	55.50824434	1.35207E-06	2.25344E-08	0.000434609	1.66932E-06	0.009565391	0.434608536	
819.0	5.86686E-06	55.50824431	1.34689E-06	2.24482E-08	0.000432946	1.66293E-06	0.009567054	0.432945606	
820.0	5.84442E-06	55.50824429	1.34174E-06	2.23623E-08	0.000431289	1.65657E-06	0.009568711	0.431289039	
821.0	5.82205E-06	55.50824427	1.33661E-06	2.22768E-08	0.000429639	1.65023E-06	0.009570361	0.429638811	
822.0	5.79978E-06	55.50824425	1.33149E-06	2.21915E-08	0.000427995	1.64391E-06	0.009572005	0.427994896	
823.0	5.77759E-06	55.50824422	1.3264E-06	2.21066E-08	0.000426357	1.63762E-06	0.009573643	0.426357272	
824.0	5.75548E-06	55.5082442	1.32132E-06	2.2022E-08	0.000424726	1.63136E-06	0.009575274	0.424725914	
825.0	5.73346E-06	55.50824418	1.31627E-06	2.19378E-08	0.000423101	1.62512E-06	0.009576899	0.423100797	
826.0	5.71152E-06	55.50824416	1.31123E-06	2.18538E-08	0.000421482	1.6189E-06	0.009578518	0.421481899	
827.0	5.68967E-06	55.50824414	1.30621E-06	2.17702E-08	0.000419869	1.6127E-06	0.009580131	0.419869195	
828.0	5.6679E-06	55.50824411	1.30121E-06	2.16869E-08	0.000418263	1.60653E-06	0.009581737	0.418262662	
829.0	5.64621E-06	55.50824409	1.29624E-06	2.16039E-08	0.000416662	1.60039E-06	0.009583338	0.416662276	
830.0	5.6246E-06	55.50824407	1.29128E-06	2.15213E-08	0.000415068	1.59426E-06	0.009584932	0.415068013	
831.0	5.60308E-06	55.50824405	1.28633E-06	2.14389E-08	0.00041348	1.58816E-06	0.00958652	0.413479851	
832.0	5.58164E-06	55.50824403	1.28141E-06	2.13569E-08	0.000411898	1.58209E-06	0.009588102	0.411897765	
833.0	5.56029E-06	55.50824401	1.27651E-06	2.12752E-08	0.000410322	1.57603E-06	0.009589678	0.410321733	
834.0	5.53901E-06	55.50824399	1.27163E-06	2.11938E-08	0.000408752	1.57E-06	0.009591248	0.408751731	
835.0	5.51782E-06	55.50824396	1.26676E-06	2.11127E-08	0.000407188	1.56399E-06	0.009592812	0.407187736	

836.0	5.49671E-06	55.50824394	1.26191E-06	2.10319E-08	0.00040563	1.55801E-06	0.00959437	0.405629725	
837.0	5.47567E-06	55.50824392	1.25708E-06	2.09514E-08	0.000404078	1.55205E-06	0.009595922	0.404077676	
838.0	5.45472E-06	55.5082439	1.25227E-06	2.08712E-08	0.000402532	1.54611E-06	0.009597468	0.402531566	
839.0	5.43385E-06	55.50824388	1.24748E-06	2.07914E-08	0.000400991	1.54019E-06	0.009599009	0.400991371	
840.0	5.41306E-06	55.50824386	1.24271E-06	2.07118E-08	0.000399457	1.5343E-06	0.009600543	0.399457069	
841.0	5.39235E-06	55.50824384	1.23796E-06	2.06326E-08	0.000397929	1.52843E-06	0.009602071	0.397928638	
842.0	5.37172E-06	55.50824382	1.23322E-06	2.05536E-08	0.000396406	1.52258E-06	0.009603594	0.396406056	
843.0	5.35116E-06	55.5082438	1.2285E-06	2.0475E-08	0.000394889	1.51676E-06	0.009605111	0.394889299	
844.0	5.33069E-06	55.50824378	1.2238E-06	2.03967E-08	0.000393378	1.51095E-06	0.009606622	0.393378346	
845.0	5.31029E-06	55.50824376	1.21912E-06	2.03186E-08	0.000391873	1.50517E-06	0.009608127	0.391873174	
846.0	5.28997E-06	55.50824374	1.21445E-06	2.02409E-08	0.000390374	1.49941E-06	0.009609626	0.390373761	
847.0	5.26973E-06	55.50824372	1.20981E-06	2.01634E-08	0.00038888	1.49368E-06	0.00961112	0.388880085	
848.0	5.24957E-06	55.5082437	1.20518E-06	2.00863E-08	0.000387392	1.48796E-06	0.009612608	0.387392125	
849.0	5.22948E-06	55.50824368	1.20056E-06	2.00094E-08	0.00038591	1.48227E-06	0.00961409	0.385909857	
850.0	5.20947E-06	55.50824366	1.19597E-06	1.99328E-08	0.000384433	1.4766E-06	0.009615567	0.384433262	
851.0	5.18954E-06	55.50824364	1.19139E-06	1.98566E-08	0.000382962	1.47095E-06	0.009617038	0.382962316	
852.0	5.16968E-06	55.50824362	1.18684E-06	1.97806E-08	0.000381497	1.46532E-06	0.009618503	0.381496999	
853.0	5.1499E-06	55.5082436	1.1823E-06	1.97049E-08	0.000380037	1.45971E-06	0.009619963	0.380037288	
854.0	5.1302E-06	55.50824358	1.17777E-06	1.96295E-08	0.000378583	1.45413E-06	0.009621417	0.378583162	
855.0	5.11057E-06	55.50824356	1.17326E-06	1.95544E-08	0.000377135	1.44856E-06	0.009622865	0.377134601	
856.0	5.09101E-06	55.50824354	1.16878E-06	1.94796E-08	0.000375692	1.44302E-06	0.009624308	0.375691582	
857.0	5.07153E-06	55.50824352	1.1643E-06	1.94051E-08	0.000374254	1.4375E-06	0.009625746	0.374254084	
858.0	5.05213E-06	55.5082435	1.15985E-06	1.93308E-08	0.000372822	1.432E-06	0.009627178	0.372822087	
859.0	5.0328E-06	55.50824348	1.15541E-06	1.92568E-08	0.000371396	1.42652E-06	0.009628604	0.371395568	
860.0	5.01354E-06	55.50824346	1.15099E-06	1.91832E-08	0.000369975	1.42106E-06	0.009630025	0.369974508	
861.0	4.99436E-06	55.50824344	1.14659E-06	1.91098E-08	0.000368559	1.41562E-06	0.009631441	0.368558886	
862.0	4.97525E-06	55.50824342	1.1422E-06	1.90366E-08	0.000367149	1.41021E-06	0.009632851	0.36714868	
863.0	4.95621E-06	55.5082434	1.13783E-06	1.89638E-08	0.000365744	1.40481E-06	0.009634256	0.36574387	
864.0	4.93725E-06	55.50824338	1.13347E-06	1.88912E-08	0.000364344	1.39944E-06	0.009635656	0.364344435	
865.0	4.91836E-06	55.50824336	1.12914E-06	1.8819E-08	0.00036295	1.39408E-06	0.00963705	0.362950354	
866.0	4.89954E-06	55.50824335	1.12482E-06	1.8747E-08	0.000361562	1.38875E-06	0.009638438	0.361561608	
867.0	4.88079E-06	55.50824333	1.12051E-06	1.86752E-08	0.000360178	1.38343E-06	0.009639822	0.360178175	
868.0	4.86211E-06	55.50824331	1.11623E-06	1.86038E-08	0.0003588	1.37814E-06	0.0096412	0.358800036	
869.0	4.84351E-06	55.50824329	1.11196E-06	1.85326E-08	0.000357427	1.37287E-06	0.009642573	0.35742717	
870.0	4.82498E-06	55.50824327	1.1077E-06	1.84617E-08	0.00035606	1.36761E-06	0.00964394	0.356059557	
871.0	4.80652E-06	55.50824325	1.10346E-06	1.8391E-08	0.000354697	1.36238E-06	0.009645303	0.354697177	
872.0	4.78813E-06	55.50824323	1.09924E-06	1.83207E-08	0.00035334	1.35717E-06	0.00964666	0.353340009	
873.0	4.76981E-06	55.50824322	1.09503E-06	1.82506E-08	0.000351988	1.35197E-06	0.009648012	0.351988035	
874.0	4.75155E-06	55.5082432	1.09084E-06	1.81807E-08	0.000350641	1.3468E-06	0.009649359	0.350641233	
875.0	4.73337E-06	55.50824318	1.08667E-06	1.81112E-08	0.0003493	1.34165E-06	0.0096507	0.349299585	
876.0	4.71526E-06	55.50824316	1.08251E-06	1.80419E-08	0.000347963	1.33651E-06	0.009652037	0.34796307	
877.0	4.69722E-06	55.50824314	1.07837E-06	1.79728E-08	0.000346632	1.3314E-06	0.009653368	0.34663167	
878.0	4.67925E-06	55.50824313	1.07424E-06	1.79041E-08	0.000345305	1.32631E-06	0.009654695	0.345305363	
879.0	4.66134E-06	55.50824311	1.07013E-06	1.78356E-08	0.000343984	1.32123E-06	0.009656016	0.343984131	
880.0	4.64351E-06	55.50824309	1.06604E-06	1.77673E-08	0.000342668	1.31618E-06	0.009657332	0.342667955	
881.0	4.62574E-06	55.50824307	1.06196E-06	1.76993E-08	0.000341357	1.31114E-06	0.009658643	0.341356814	
882.0	4.60804E-06	55.50824305	1.0579E-06	1.76316E-08	0.000340051	1.30612E-06	0.009659949	0.340050691	
883.0	4.59041E-06	55.50824304	1.05385E-06	1.75642E-08	0.00033875	1.30113E-06	0.00966125	0.338749565	

884.0	4.57285E-06	55.50824302	1.04982E-06	1.74969E-08	0.000337453	1.29615E-06	0.009662547	0.337453417
885.0	4.55535E-06	55.508243	1.0458E-06	1.743E-08	0.000336162	1.29119E-06	0.009663838	0.336162229
886.0	4.53792E-06	55.50824298	1.0418E-06	1.73633E-08	0.000334876	1.28625E-06	0.009665124	0.334875982
887.0	4.52056E-06	55.50824297	1.03781E-06	1.72969E-08	0.000333595	1.28133E-06	0.009666405	0.333594656
888.0	4.50326E-06	55.50824295	1.03384E-06	1.72307E-08	0.000332318	1.27642E-06	0.009667682	0.332318232
889.0	4.48603E-06	55.50824293	1.02989E-06	1.71648E-08	0.000331047	1.27154E-06	0.009668953	0.331046693
890.0	4.46886E-06	55.50824292	1.02594E-06	1.70991E-08	0.00032978	1.26667E-06	0.00967022	0.329780018
891.0	4.45176E-06	55.5082429	1.02202E-06	1.70337E-08	0.000328518	1.26183E-06	0.009671482	0.328518191
892.0	4.43473E-06	55.50824288	1.01811E-06	1.69685E-08	0.000327261	1.257E-06	0.009672739	0.327261191
893.0	4.41776E-06	55.50824286	1.01421E-06	1.69036E-08	0.000326009	1.25219E-06	0.009673991	0.326009001
894.0	4.40086E-06	55.50824285	1.01033E-06	1.68389E-08	0.000324762	1.2474E-06	0.009675238	0.324761603
895.0	4.38402E-06	55.50824283	1.00647E-06	1.67744E-08	0.000323519	1.24263E-06	0.009676481	0.323518977
896.0	4.36725E-06	55.50824281	1.00262E-06	1.67103E-08	0.000322281	1.23787E-06	0.009677719	0.322281106
897.0	4.35053E-06	55.5082428	9.98779E-07	1.66463E-08	0.000321048	1.23313E-06	0.009678952	0.321047971
898.0	4.33389E-06	55.50824278	9.94958E-07	1.65826E-08	0.00031982	1.22842E-06	0.00968018	0.319819555
899.0	4.31731E-06	55.50824276	9.91151E-07	1.65192E-08	0.000318596	1.22372E-06	0.009681404	0.318595839
900.0	4.30079E-06	55.50824275	9.87358E-07	1.6456E-08	0.000317377	1.21903E-06	0.009682623	0.317376805
901.0	4.28433E-06	55.50824273	9.83581E-07	1.6393E-08	0.000316162	1.21437E-06	0.009683838	0.316162435
902.0	4.26794E-06	55.50824271	9.79817E-07	1.63303E-08	0.000314953	1.20972E-06	0.009685047	0.314952712
903.0	4.25161E-06	55.5082427	9.76068E-07	1.62678E-08	0.000313748	1.20509E-06	0.009686252	0.313747618
904.0	4.23534E-06	55.50824268	9.72333E-07	1.62056E-08	0.000312547	1.20048E-06	0.009687453	0.312547135
905.0	4.21913E-06	55.50824267	9.68613E-07	1.61435E-08	0.000311351	1.19589E-06	0.009688649	0.311351245
906.0	4.20299E-06	55.50824265	9.64907E-07	1.60818E-08	0.00031016	1.19131E-06	0.00968984	0.31015993
907.0	4.18691E-06	55.50824263	9.61215E-07	1.60202E-08	0.000308973	1.18676E-06	0.009691027	0.308973175
908.0	4.17089E-06	55.50824262	9.57537E-07	1.59589E-08	0.000307791	1.18221E-06	0.009692209	0.30779096
909.0	4.15493E-06	55.5082426	9.53873E-07	1.58979E-08	0.000306613	1.17769E-06	0.009693387	0.306613268
910.0	4.13903E-06	55.50824259	9.50223E-07	1.58371E-08	0.00030544	1.17319E-06	0.00969456	0.305440083
911.0	4.12319E-06	55.50824257	9.46588E-07	1.57765E-08	0.000304271	1.1687E-06	0.009695729	0.304271386
912.0	4.10742E-06	55.50824255	9.42966E-07	1.57161E-08	0.000303107	1.16422E-06	0.009696893	0.303107162
913.0	4.0917E-06	55.50824254	9.39358E-07	1.5656E-08	0.000301947	1.15977E-06	0.009698053	0.301947392
914.0	4.07605E-06	55.50824252	9.35763E-07	1.55961E-08	0.000300792	1.15533E-06	0.009699208	0.300792059
915.0	4.06045E-06	55.50824251	9.32183E-07	1.55364E-08	0.000299641	1.15091E-06	0.009700359	0.299641148
916.0	4.04491E-06	55.50824249	9.28616E-07	1.54769E-08	0.000298495	1.14651E-06	0.009701505	0.298494639
917.0	4.02944E-06	55.50824248	9.25063E-07	1.54177E-08	0.000297353	1.14212E-06	0.009702647	0.297352518
918.0	4.01402E-06	55.50824246	9.21523E-07	1.53587E-08	0.000296215	1.13775E-06	0.009703785	0.296214767
919.0	3.99866E-06	55.50824244	9.17997E-07	1.53E-08	0.000295081	1.1334E-06	0.009704919	0.295081369
920.0	3.98336E-06	55.50824243	9.14485E-07	1.52414E-08	0.000293952	1.12906E-06	0.009706048	0.293952308
921.0	3.96812E-06	55.50824241	9.10986E-07	1.51831E-08	0.000292828	1.12474E-06	0.009707172	0.292827567
922.0	3.95294E-06	55.5082424	9.075E-07	1.5125E-08	0.000291707	1.12044E-06	0.009708293	0.291707129
923.0	3.93781E-06	55.50824238	9.04028E-07	1.50671E-08	0.000290591	1.11615E-06	0.009709409	0.290590979
924.0	3.92274E-06	55.50824237	9.00569E-07	1.50095E-08	0.000289479	1.11188E-06	0.009710521	0.289479099
925.0	3.90773E-06	55.50824235	8.97123E-07	1.4952E-08	0.000288371	1.10763E-06	0.009711629	0.288371474
926.0	3.89278E-06	55.50824234	8.9369E-07	1.48948E-08	0.000287268	1.10339E-06	0.009712732	0.287268087
927.0	3.87789E-06	55.50824232	8.90271E-07	1.48378E-08	0.000286169	1.09917E-06	0.009713831	0.286168921
928.0	3.86305E-06	55.50824231	8.86864E-07	1.47811E-08	0.000285074	1.09496E-06	0.009714926	0.285073962
929.0	3.84827E-06	55.50824229	8.83471E-07	1.47245E-08	0.000283983	1.09077E-06	0.009716017	0.283983191
930.0	3.83354E-06	55.50824228	8.80091E-07	1.46682E-08	0.000282897	1.0866E-06	0.009717103	0.282896595
931.0	3.81888E-06	55.50824227	8.76723E-07	1.46121E-08	0.000281814	1.08244E-06	0.009718186	0.281814156

932.0	3.80426E-06	55.50824225	8.73369E-07	1.45561E-08	0.000280736	1.0783E-06	0.009719264	0.280735859
933.0	3.78971E-06	55.50824224	8.70027E-07	1.45004E-08	0.000279662	1.07417E-06	0.009720338	0.279661687
934.0	3.77521E-06	55.50824222	8.66698E-07	1.4445E-08	0.000278592	1.07006E-06	0.009721408	0.278591626
935.0	3.76076E-06	55.50824221	8.63382E-07	1.43897E-08	0.000277526	1.06597E-06	0.009722474	0.277525659
936.0	3.74637E-06	55.50824219	8.60078E-07	1.43346E-08	0.000276464	1.06189E-06	0.009723536	0.276463771
937.0	3.73204E-06	55.50824218	8.56787E-07	1.42798E-08	0.000275406	1.05783E-06	0.009724594	0.275405946
938.0	3.71776E-06	55.50824216	8.53509E-07	1.42251E-08	0.000274352	1.05378E-06	0.009725648	0.274352168
939.0	3.70353E-06	55.50824215	8.50243E-07	1.41707E-08	0.000273302	1.04975E-06	0.009726698	0.273302422
940.0	3.68936E-06	55.50824214	8.4699E-07	1.41165E-08	0.000272257	1.04573E-06	0.009727743	0.272256693
941.0	3.67525E-06	55.50824212	8.43749E-07	1.40625E-08	0.000271215	1.04173E-06	0.009728785	0.271214966
942.0	3.66118E-06	55.50824211	8.40521E-07	1.40087E-08	0.000270177	1.03774E-06	0.009729823	0.270177224
943.0	3.64717E-06	55.50824209	8.37305E-07	1.39551E-08	0.000269143	1.03377E-06	0.009730857	0.269143453
944.0	3.63322E-06	55.50824208	8.34101E-07	1.39017E-08	0.000268114	1.02982E-06	0.009731886	0.268113637
945.0	3.61932E-06	55.50824207	8.30909E-07	1.38485E-08	0.000267088	1.02588E-06	0.009732912	0.267087762
946.0	3.60547E-06	55.50824205	8.2773E-07	1.37955E-08	0.000266066	1.02195E-06	0.009733934	0.266065812
947.0	3.59167E-06	55.50824204	8.24563E-07	1.37427E-08	0.000265048	1.01804E-06	0.009734952	0.265047772
948.0	3.57793E-06	55.50824202	8.21408E-07	1.36901E-08	0.000264034	1.01414E-06	0.009735966	0.264033627
949.0	3.56424E-06	55.50824201	8.18265E-07	1.36378E-08	0.000263023	1.01026E-06	0.009736977	0.263023363
950.0	3.5506E-06	55.508242	8.15134E-07	1.35856E-08	0.000262017	1.0064E-06	0.009737983	0.262016965
951.0	3.53702E-06	55.50824198	8.12015E-07	1.35336E-08	0.000261014	1.00255E-06	0.009738986	0.261014417
952.0	3.52348E-06	55.50824197	8.08908E-07	1.34818E-08	0.000260016	9.98712E-07	0.009739984	0.260015705
953.0	3.51E-06	55.50824196	8.05813E-07	1.34302E-08	0.000259021	9.9489E-07	0.009740979	0.259020815
954.0	3.49657E-06	55.50824194	8.0273E-07	1.33788E-08	0.00025803	9.91084E-07	0.00974197	0.258029731
955.0	3.48319E-06	55.50824193	7.99658E-07	1.33276E-08	0.000257042	9.87292E-07	0.009742958	0.257042439
956.0	3.46987E-06	55.50824192	7.96599E-07	1.32766E-08	0.000256059	9.83514E-07	0.009743941	0.256058926
957.0	3.45659E-06	55.5082419	7.93551E-07	1.32258E-08	0.000255079	9.79751E-07	0.009744921	0.255079175
958.0	3.44336E-06	55.50824189	7.90514E-07	1.31752E-08	0.000254103	9.76002E-07	0.009745897	0.254103173
959.0	3.43019E-06	55.50824188	7.8749E-07	1.31248E-08	0.000253131	9.72267E-07	0.009746869	0.253130905
960.0	3.41706E-06	55.50824186	7.84476E-07	1.30746E-08	0.000252162	9.68547E-07	0.009747838	0.252162358
961.0	3.40399E-06	55.50824185	7.81475E-07	1.30246E-08	0.000251198	9.64841E-07	0.009748802	0.251197517
962.0	3.39096E-06	55.50824184	7.78485E-07	1.29747E-08	0.000250236	9.6115E-07	0.009749764	0.250236367
963.0	3.37799E-06	55.50824182	7.75506E-07	1.29251E-08	0.000249279	9.57472E-07	0.009750721	0.249278895
964.0	3.36506E-06	55.50824181	7.72539E-07	1.28756E-08	0.000248325	9.53808E-07	0.009751675	0.248325086
965.0	3.35219E-06	55.5082418	7.69583E-07	1.28264E-08	0.000247375	9.50159E-07	0.009752625	0.247374928
966.0	3.33936E-06	55.50824179	7.66638E-07	1.27773E-08	0.000246428	9.46523E-07	0.009753572	0.246428404
967.0	3.32658E-06	55.50824177	7.63705E-07	1.27284E-08	0.000245486	9.42902E-07	0.009754514	0.245485502
968.0	3.31386E-06	55.50824176	7.60783E-07	1.26797E-08	0.000244546	9.39294E-07	0.009755454	0.244546208
969.0	3.30118E-06	55.50824175	7.57872E-07	1.26312E-08	0.000243611	9.357E-07	0.009756389	0.243610509
970.0	3.28855E-06	55.50824173	7.54972E-07	1.25829E-08	0.000242678	9.3212E-07	0.009757322	0.242678389
971.0	3.27596E-06	55.50824172	7.52083E-07	1.25347E-08	0.00024175	9.28553E-07	0.00975825	0.241749836
972.0	3.26343E-06	55.50824171	7.49205E-07	1.24868E-08	0.000240825	9.25E-07	0.009759175	0.240824835
973.0	3.25094E-06	55.5082417	7.46339E-07	1.2439E-08	0.000239903	9.21461E-07	0.009760097	0.239903374
974.0	3.2385E-06	55.50824168	7.43483E-07	1.23914E-08	0.000238985	9.17935E-07	0.009761015	0.238985439
975.0	3.22611E-06	55.50824167	7.40638E-07	1.2344E-08	0.000238071	9.14423E-07	0.009761929	0.238071016
976.0	3.21377E-06	55.50824166	7.37804E-07	1.22967E-08	0.00023716	9.10924E-07	0.00976284	0.237160092
977.0	3.20147E-06	55.50824165	7.34981E-07	1.22497E-08	0.000236253	9.07439E-07	0.009763747	0.236252653
978.0	3.18922E-06	55.50824164	7.32169E-07	1.22028E-08	0.000235349	9.03967E-07	0.009764651	0.235348687
979.0	3.17702E-06	55.50824162	7.29368E-07	1.21561E-08	0.000234448	9.00508E-07	0.009765552	0.234448179

980.0	3.16486E-06	55.50824161	7.26577E-07	1.21096E-08	0.000233551	8.97062E-07	0.009766449	0.233551117
981.0	3.15275E-06	55.5082416	7.23797E-07	1.20633E-08	0.000232657	8.9363E-07	0.009767343	0.232657487
982.0	3.14069E-06	55.50824159	7.21027E-07	1.20171E-08	0.000231767	8.9021E-07	0.009768233	0.231767277
983.0	3.12867E-06	55.50824157	7.18269E-07	1.19711E-08	0.00023088	8.86804E-07	0.00976912	0.230880472
984.0	3.1167E-06	55.50824156	7.1552E-07	1.19253E-08	0.000229997	8.83411E-07	0.009770003	0.229997061
985.0	3.10477E-06	55.50824155	7.12783E-07	1.18797E-08	0.000229117	8.80031E-07	0.009770883	0.22911703
986.0	3.0929E-06	55.50824154	7.10055E-07	1.18343E-08	0.00022824	8.76664E-07	0.00977176	0.228240367
987.0	3.08106E-06	55.50824153	7.07338E-07	1.1789E-08	0.000227367	8.73309E-07	0.009772633	0.227367057
988.0	3.06927E-06	55.50824152	7.04632E-07	1.17439E-08	0.000226497	8.69968E-07	0.009773503	0.226497089
989.0	3.05753E-06	55.5082415	7.01936E-07	1.16989E-08	0.00022563	8.66639E-07	0.00977437	0.22563045
990.0	3.04583E-06	55.50824149	6.9925E-07	1.16542E-08	0.000224767	8.63323E-07	0.009775233	0.224767127
991.0	3.03417E-06	55.50824148	6.96574E-07	1.16096E-08	0.000223907	8.6002E-07	0.009776093	0.223907107
992.0	3.02257E-06	55.50824147	6.93909E-07	1.15652E-08	0.00022305	8.56729E-07	0.00977695	0.223050378
993.0	3.011E-06	55.50824146	6.91254E-07	1.15209E-08	0.000222197	8.53451E-07	0.009777803	0.222196927
994.0	2.99948E-06	55.50824145	6.88609E-07	1.14768E-08	0.000221347	8.50186E-07	0.009778653	0.221346741
995.0	2.988E-06	55.50824143	6.85974E-07	1.14329E-08	0.0002205	8.46933E-07	0.0097795	0.220499809
996.0	2.97657E-06	55.50824142	6.8335E-07	1.13892E-08	0.000219656	8.43692E-07	0.009780344	0.219656117
997.0	2.96518E-06	55.50824141	6.80735E-07	1.13456E-08	0.000218816	8.40464E-07	0.009781184	0.218815653
998.0	2.95383E-06	55.5082414	6.7813E-07	1.13022E-08	0.000217978	8.37248E-07	0.009782022	0.217978405
999.0	2.94253E-06	55.50824139	6.75536E-07	1.12589E-08	0.000217144	8.34044E-07	0.009782856	0.217144361
1000.0	2.93127E-06	55.50824138	6.72951E-07	1.12158E-08	0.000216314	8.30853E-07	0.009783686	0.216313508
1001.0	2.92006E-06	55.50824137	6.70376E-07	1.11729E-08	0.000215486	8.27674E-07	0.009784514	0.215485834
1002.0	2.90888E-06	55.50824136	6.67811E-07	1.11302E-08	0.000214661	8.24507E-07	0.009785339	0.214661327
1003.0	2.89775E-06	55.50824134	6.65256E-07	1.10876E-08	0.00021384	8.21352E-07	0.00978616	0.213839975
1004.0	2.88667E-06	55.50824133	6.6271E-07	1.10452E-08	0.000213022	8.1821E-07	0.009786978	0.213021765
1005.0	2.87562E-06	55.50824132	6.60174E-07	1.10029E-08	0.000212207	8.15079E-07	0.009787793	0.212206686
1006.0	2.86462E-06	55.50824131	6.57648E-07	1.09608E-08	0.000211395	8.1196E-07	0.009788605	0.211394726
1007.0	2.85366E-06	55.5082413	6.55132E-07	1.09189E-08	0.000210586	8.08853E-07	0.009789414	0.210585873
1008.0	2.84274E-06	55.50824129	6.52625E-07	1.08771E-08	0.00020978	8.05759E-07	0.00979022	0.209780114
1009.0	2.83186E-06	55.50824128	6.50128E-07	1.08355E-08	0.000208977	8.02675E-07	0.009791023	0.208977439
1010.0	2.82103E-06	55.50824127	6.47641E-07	1.0794E-08	0.000208178	7.99604E-07	0.009791822	0.208177834
1011.0	2.81023E-06	55.50824126	6.45163E-07	1.07527E-08	0.000207381	7.96545E-07	0.009792619	0.20738129
1012.0	2.79948E-06	55.50824125	6.42694E-07	1.07116E-08	0.000206588	7.93497E-07	0.009793412	0.206587793
1013.0	2.78877E-06	55.50824123	6.40235E-07	1.06706E-08	0.000205797	7.90461E-07	0.009794203	0.205797332
1014.0	2.7781E-06	55.50824122	6.37785E-07	1.06298E-08	0.00020501	7.87436E-07	0.00979499	0.205009896
1015.0	2.76747E-06	55.50824121	6.35345E-07	1.05891E-08	0.000204225	7.84423E-07	0.009795775	0.204225472
1016.0	2.75688E-06	55.5082412	6.32914E-07	1.05486E-08	0.000203444	7.81422E-07	0.009796556	0.20344405
1017.0	2.74633E-06	55.50824119	6.30492E-07	1.05082E-08	0.000202666	7.78432E-07	0.009797334	0.202665619
1018.0	2.73582E-06	55.50824118	6.2808E-07	1.0468E-08	0.00020189	7.75453E-07	0.00979811	0.201890165
1019.0	2.72535E-06	55.50824117	6.25677E-07	1.04279E-08	0.000201118	7.72486E-07	0.009798882	0.201117679
1020.0	2.71493E-06	55.50824116	6.23283E-07	1.0388E-08	0.000200348	7.69531E-07	0.009799652	0.200348148
1021.0	2.70454E-06	55.50824115	6.20898E-07	1.03483E-08	0.000199582	7.66586E-07	0.009800418	0.199581562
1022.0	2.69419E-06	55.50824114	6.18522E-07	1.03087E-08	0.000198818	7.63653E-07	0.009801182	0.198817909
1023.0	2.68388E-06	55.50824113	6.16155E-07	1.02693E-08	0.000198057	7.60731E-07	0.009801943	0.198057178
1024.0	2.67361E-06	55.50824112	6.13798E-07	1.023E-08	0.000197299	7.5782E-07	0.009802701	0.197299357
1025.0	2.66338E-06	55.50824111	6.11449E-07	1.01908E-08	0.000196544	7.54921E-07	0.009803456	0.196544437
1026.0	2.65319E-06	55.5082411	6.0911E-07	1.01518E-08	0.000195792	7.52032E-07	0.009804208	0.195792404
1027.0	2.64304E-06	55.50824109	6.06779E-07	1.0113E-08	0.000195043	7.49155E-07	0.009804957	0.19504325

1028.0	2.63293E-06	55.50824108	6.04457E-07	1.00743E-08	0.000194297	7.46288E-07	0.009805703	0.194296962	
1029.0	2.62285E-06	55.50824107	6.02145E-07	1.00357E-08	0.000193554	7.43433E-07	0.009806446	0.193553529	
1030.0	2.61282E-06	55.50824106	5.99841E-07	9.99734E-09	0.000192813	7.40588E-07	0.009807187	0.192812941	
1031.0	2.60282E-06	55.50824105	5.97545E-07	9.95909E-09	0.000192075	7.37754E-07	0.009807925	0.192075186	
1032.0	2.59286E-06	55.50824104	5.95259E-07	9.92098E-09	0.00019134	7.34932E-07	0.00980866	0.191340255	
1033.0	2.58294E-06	55.50824103	5.92981E-07	9.88302E-09	0.000190608	7.3212E-07	0.009809392	0.190608135	
1034.0	2.57306E-06	55.50824102	5.90713E-07	9.84521E-09	0.000189879	7.29318E-07	0.009810121	0.189878817	
1035.0	2.56321E-06	55.50824101	5.88452E-07	9.80754E-09	0.000189152	7.26528E-07	0.009810848	0.189152289	
1036.0	2.5534E-06	55.508241	5.86201E-07	9.77001E-09	0.000188429	7.23748E-07	0.009811571	0.188428541	
1037.0	2.54363E-06	55.50824099	5.83958E-07	9.73263E-09	0.000187708	7.20979E-07	0.009812292	0.187707563	
1038.0	2.5339E-06	55.50824098	5.81723E-07	9.69539E-09	0.000186989	7.1822E-07	0.009813011	0.186989343	
1039.0	2.52421E-06	55.50824097	5.79498E-07	9.65829E-09	0.000186274	7.15472E-07	0.009813726	0.186273871	
1040.0	2.51455E-06	55.50824096	5.7728E-07	9.62134E-09	0.000185561	7.12734E-07	0.009814439	0.185561137	
1041.0	2.50493E-06	55.50824095	5.75071E-07	9.58452E-09	0.000184851	7.10007E-07	0.009815149	0.18485113	
1042.0	2.49534E-06	55.50824094	5.72871E-07	9.54785E-09	0.000184144	7.0729E-07	0.009815856	0.184143839	
1043.0	2.48579E-06	55.50824093	5.70679E-07	9.51132E-09	0.000183439	7.04584E-07	0.009816561	0.183439255	
1044.0	2.47628E-06	55.50824092	5.68495E-07	9.47492E-09	0.000182737	7.01888E-07	0.009817263	0.182737367	
1045.0	2.46681E-06	55.50824091	5.6632E-07	9.43867E-09	0.000182038	6.99203E-07	0.009817962	0.182038164	
1046.0	2.45737E-06	55.5082409	5.64153E-07	9.40256E-09	0.000181342	6.96527E-07	0.009818658	0.181341637	
1047.0	2.44797E-06	55.50824089	5.61995E-07	9.36658E-09	0.000180648	6.93862E-07	0.009819352	0.180647775	
1048.0	2.4386E-06	55.50824088	5.59844E-07	9.33074E-09	0.000179957	6.91207E-07	0.009820043	0.179956568	
1049.0	2.42927E-06	55.50824088	5.57702E-07	9.29504E-09	0.000179268	6.88563E-07	0.009820732	0.179268005	
1050.0	2.41997E-06	55.50824087	5.55568E-07	9.25947E-09	0.000178582	6.85928E-07	0.009821418	0.178582077	
1051.0	2.41071E-06	55.50824086	5.53443E-07	9.22404E-09	0.000177899	6.83303E-07	0.009822101	0.177898774	
1052.0	2.40149E-06	55.50824085	5.51325E-07	9.18875E-09	0.000177218	6.80689E-07	0.009822782	0.177218085	
1053.0	2.3923E-06	55.50824084	5.49215E-07	9.15359E-09	0.00017654	6.78084E-07	0.00982346	0.176540001	
1054.0	2.38315E-06	55.50824083	5.47114E-07	9.11857E-09	0.000175865	6.7549E-07	0.009824135	0.175864511	
1055.0	2.37403E-06	55.50824082	5.45021E-07	9.08368E-09	0.000175192	6.72905E-07	0.009824808	0.175191606	
1056.0	2.36495E-06	55.50824081	5.42935E-07	9.04892E-09	0.000174521	6.7033E-07	0.009825479	0.174521275	
1057.0	2.3559E-06	55.5082408	5.40858E-07	9.0143E-09	0.000173854	6.67766E-07	0.009826146	0.17385351	
1058.0	2.34688E-06	55.50824079	5.38788E-07	8.97981E-09	0.000173188	6.65211E-07	0.009826812	0.173188299	
1059.0	2.3379E-06	55.50824078	5.36727E-07	8.94545E-09	0.000172526	6.62665E-07	0.009827474	0.172525634	
1060.0	2.32896E-06	55.50824078	5.34673E-07	8.91122E-09	0.000171866	6.6013E-07	0.009828134	0.171865504	
1061.0	2.32005E-06	55.50824077	5.32627E-07	8.87712E-09	0.000171208	6.57604E-07	0.009828792	0.1712079	
1062.0	2.31117E-06	55.50824076	5.30589E-07	8.84316E-09	0.000170553	6.55088E-07	0.009829447	0.170552813	
1063.0	2.30233E-06	55.50824075	5.28559E-07	8.80932E-09	0.0001699	6.52581E-07	0.0098301	0.169900231	
1064.0	2.29352E-06	55.50824074	5.26537E-07	8.77561E-09	0.00016925	6.50084E-07	0.00983075	0.169250147	
1065.0	2.28474E-06	55.50824073	5.24522E-07	8.74203E-09	0.000168603	6.47597E-07	0.009831397	0.16860255	
1066.0	2.276E-06	55.50824072	5.22515E-07	8.70859E-09	0.000167957	6.45119E-07	0.009832043	0.167957431	
1067.0	2.26729E-06	55.50824071	5.20516E-07	8.67526E-09	0.000167315	6.42651E-07	0.009832685	0.167314781	
1068.0	2.25861E-06	55.5082407	5.18524E-07	8.64207E-09	0.000166675	6.40192E-07	0.009833325	0.166674589	
1069.0	2.24997E-06	55.5082407	5.1654E-07	8.609E-09	0.000166037	6.37742E-07	0.009833963	0.166036847	
1070.0	2.24136E-06	55.50824069	5.14564E-07	8.57606E-09	0.000165402	6.35302E-07	0.009834598	0.165401545	
1071.0	2.23279E-06	55.50824068	5.12595E-07	8.54325E-09	0.000164769	6.32871E-07	0.009835231	0.164768674	
1072.0	2.22424E-06	55.50824067	5.10634E-07	8.51056E-09	0.000164138	6.3045E-07	0.009835862	0.164138225	
1073.0	2.21573E-06	55.50824066	5.0868E-07	8.478E-09	0.00016351	6.28037E-07	0.00983649	0.163510187	
1074.0	2.20726E-06	55.50824065	5.06733E-07	8.44556E-09	0.000162885	6.25634E-07	0.009837115	0.162884553	
1075.0	2.19881E-06	55.50824065	5.04795E-07	8.41324E-09	0.000162261	6.2324E-07	0.009837739	0.162261313	

1076.0	2.1904E-06	55.50824064	5.02863E-07	8.38105E-09	0.00016164	6.20856E-07	0.00983836	0.161640457
1077.0	2.18202E-06	55.50824063	5.00939E-07	8.34898E-09	0.000161022	6.1848E-07	0.009838978	0.161021977
1078.0	2.17367E-06	55.50824062	4.99022E-07	8.31704E-09	0.000160406	6.16114E-07	0.009839594	0.160405863
1079.0	2.16535E-06	55.50824061	4.97113E-07	8.28521E-09	0.000159792	6.13756E-07	0.009840208	0.159792107
1080.0	2.15706E-06	55.5082406	4.95211E-07	8.25351E-09	0.000159181	6.11408E-07	0.009840819	0.159180699
1081.0	2.14881E-06	55.5082406	4.93316E-07	8.22193E-09	0.000158572	6.09068E-07	0.009841428	0.158571631
1082.0	2.14059E-06	55.50824059	4.91428E-07	8.19047E-09	0.000157965	6.06738E-07	0.009842035	0.157964893
1083.0	2.1324E-06	55.50824058	4.89548E-07	8.15913E-09	0.00015736	6.04416E-07	0.00984264	0.157360477
1084.0	2.12424E-06	55.50824057	4.87675E-07	8.12791E-09	0.000156758	6.02104E-07	0.009843242	0.156758373
1085.0	2.11611E-06	55.50824056	4.85809E-07	8.09682E-09	0.000156159	5.998E-07	0.009843841	0.156158573
1086.0	2.10801E-06	55.50824055	4.8395E-07	8.06583E-09	0.000155561	5.97505E-07	0.009844439	0.155561068
1087.0	2.09995E-06	55.50824055	4.82098E-07	8.03497E-09	0.000154966	5.95219E-07	0.009845034	0.154965849
1088.0	2.09191E-06	55.50824054	4.80254E-07	8.00423E-09	0.000154373	5.92941E-07	0.009845627	0.154372908
1089.0	2.08391E-06	55.50824053	4.78416E-07	7.9736E-09	0.000153782	5.90672E-07	0.009846218	0.153782236
1090.0	2.07594E-06	55.50824052	4.76586E-07	7.94309E-09	0.000153194	5.88412E-07	0.009846806	0.153193823
1091.0	2.06799E-06	55.50824051	4.74762E-07	7.9127E-09	0.000152608	5.86161E-07	0.009847392	0.152607662
1092.0	2.06008E-06	55.50824051	4.72945E-07	7.88242E-09	0.000152024	5.83918E-07	0.009847976	0.152023744
1093.0	2.0522E-06	55.5082405	4.71136E-07	7.85226E-09	0.000151442	5.81684E-07	0.009848558	0.15144206
1094.0	2.04435E-06	55.50824049	4.69333E-07	7.82222E-09	0.000150863	5.79458E-07	0.009849137	0.150862602
1095.0	2.03652E-06	55.50824048	4.67537E-07	7.79229E-09	0.000150285	5.77241E-07	0.009849715	0.150285361
1096.0	2.02873E-06	55.50824047	4.65748E-07	7.76247E-09	0.00014971	5.75032E-07	0.00985029	0.149710328
1097.0	2.02097E-06	55.50824047	4.63966E-07	7.73277E-09	0.000149137	5.72832E-07	0.009850863	0.149137496
1098.0	2.01324E-06	55.50824046	4.62191E-07	7.70319E-09	0.000148567	5.7064E-07	0.009851433	0.148566856
1099.0	2.00553E-06	55.50824045	4.60423E-07	7.67371E-09	0.000147998	5.68457E-07	0.009852002	0.147998399
1100.0	1.99786E-06	55.50824044	4.58661E-07	7.64435E-09	0.000147432	5.66282E-07	0.009852568	0.147432117
1101.0	1.99021E-06	55.50824044	4.56906E-07	7.6151E-09	0.000146868	5.64115E-07	0.009853132	0.146868002
1102.0	1.9826E-06	55.50824043	4.55158E-07	7.58596E-09	0.000146306	5.61957E-07	0.009853694	0.146306045
1103.0	1.97501E-06	55.50824042	4.53416E-07	7.55694E-09	0.000145746	5.59806E-07	0.009854254	0.145746238
1104.0	1.96746E-06	55.50824041	4.51681E-07	7.52802E-09	0.000145189	5.57665E-07	0.009854811	0.145188574
1105.0	1.95993E-06	55.50824041	4.49953E-07	7.49922E-09	0.000144633	5.55531E-07	0.009855367	0.144633043
1106.0	1.95243E-06	55.5082404	4.48231E-07	7.47052E-09	0.00014408	5.53405E-07	0.00985592	0.144079638
1107.0	1.94496E-06	55.50824039	4.46516E-07	7.44194E-09	0.000143528	5.51288E-07	0.009856472	0.14352835
1108.0	1.93752E-06	55.50824038	4.44808E-07	7.41346E-09	0.000142979	5.49178E-07	0.009857021	0.142979172
1109.0	1.9301E-06	55.50824038	4.43106E-07	7.3851E-09	0.000142432	5.47077E-07	0.009857568	0.142432095
1110.0	1.92272E-06	55.50824037	4.4141E-07	7.35684E-09	0.000141887	5.44984E-07	0.009858113	0.141887111
1111.0	1.91536E-06	55.50824036	4.39721E-07	7.32869E-09	0.000141344	5.42898E-07	0.009858656	0.141344213
1112.0	1.90803E-06	55.50824035	4.38039E-07	7.30065E-09	0.000140803	5.40821E-07	0.009859197	0.140803392
1113.0	1.90073E-06	55.50824035	4.36363E-07	7.27272E-09	0.000140265	5.38752E-07	0.009859735	0.14026464
1114.0	1.89346E-06	55.50824034	4.34693E-07	7.24489E-09	0.000139728	5.3669E-07	0.009860272	0.139727949
1115.0	1.88621E-06	55.50824033	4.3303E-07	7.21717E-09	0.000139193	5.34637E-07	0.009860807	0.139193312
1116.0	1.879E-06	55.50824033	4.31373E-07	7.18955E-09	0.000138661	5.32591E-07	0.009861339	0.138660721
1117.0	1.87181E-06	55.50824032	4.29723E-07	7.16204E-09	0.00013813	5.30553E-07	0.00986187	0.138130168
1118.0	1.86465E-06	55.50824031	4.28078E-07	7.13464E-09	0.000137602	5.28523E-07	0.009862398	0.137601644
1119.0	1.85751E-06	55.5082403	4.2644E-07	7.10734E-09	0.000137075	5.26501E-07	0.009862925	0.137075143
1120.0	1.8504E-06	55.5082403	4.24809E-07	7.08015E-09	0.000136551	5.24487E-07	0.009863449	0.136550657
1121.0	1.84332E-06	55.50824029	4.23183E-07	7.05306E-09	0.000136028	5.2248E-07	0.009863972	0.136028177
1122.0	1.83627E-06	55.50824028	4.21564E-07	7.02607E-09	0.000135508	5.20481E-07	0.009864492	0.135507696
1123.0	1.82924E-06	55.50824028	4.19951E-07	6.99918E-09	0.000134989	5.18489E-07	0.009865011	0.134989207

1124.0	1.82225E-06	55.50824027	4.18344E-07	6.9724E-09	0.000134473	5.16505E-07	0.009865527	0.134472702
1125.0	1.81527E-06	55.50824026	4.16744E-07	6.94573E-09	0.000133958	5.14529E-07	0.009866042	0.133958173
1126.0	1.80833E-06	55.50824025	4.15149E-07	6.91915E-09	0.000133446	5.1256E-07	0.009866554	0.133445613
1127.0	1.80141E-06	55.50824025	4.1356E-07	6.89267E-09	0.000132935	5.10599E-07	0.009867065	0.132935014
1128.0	1.79452E-06	55.50824024	4.11978E-07	6.8663E-09	0.000132426	5.08645E-07	0.009867574	0.132426369
1129.0	1.78765E-06	55.50824023	4.10402E-07	6.84003E-09	0.00013192	5.06699E-07	0.00986808	0.13191967
1130.0	1.78081E-06	55.50824023	4.08831E-07	6.81386E-09	0.000131415	5.0476E-07	0.009868585	0.131414909
1131.0	1.774E-06	55.50824022	4.07267E-07	6.78779E-09	0.000130912	5.02829E-07	0.009869088	0.13091208
1132.0	1.76721E-06	55.50824021	4.05709E-07	6.76181E-09	0.000130411	5.00905E-07	0.009869589	0.130411175
1133.0	1.76045E-06	55.50824021	4.04156E-07	6.73594E-09	0.000129912	4.98988E-07	0.009870088	0.129912187
1134.0	1.75371E-06	55.5082402	4.0261E-07	6.71017E-09	0.000129415	4.97079E-07	0.009870585	0.129415108
1135.0	1.747E-06	55.50824019	4.0107E-07	6.68449E-09	0.00012892	4.95177E-07	0.00987108	0.12891993
1136.0	1.74032E-06	55.50824019	3.99535E-07	6.65892E-09	0.000128427	4.93283E-07	0.009871573	0.128426648
1137.0	1.73366E-06	55.50824018	3.98006E-07	6.63344E-09	0.000127935	4.91395E-07	0.009872065	0.127935253
1138.0	1.72702E-06	55.50824017	3.96483E-07	6.60806E-09	0.000127446	4.89515E-07	0.009872554	0.127445738
1139.0	1.72041E-06	55.50824017	3.94966E-07	6.58277E-09	0.000126958	4.87642E-07	0.009873042	0.126958096
1140.0	1.71383E-06	55.50824016	3.93455E-07	6.55758E-09	0.000126472	4.85776E-07	0.009873528	0.12647232
1141.0	1.70727E-06	55.50824015	3.9195E-07	6.53249E-09	0.000125988	4.83917E-07	0.009874012	0.125988403
1142.0	1.70074E-06	55.50824015	3.9045E-07	6.5075E-09	0.000125506	4.82066E-07	0.009874494	0.125506337
1143.0	1.69423E-06	55.50824014	3.88956E-07	6.4826E-09	0.000125026	4.80221E-07	0.009874974	0.125026116
1144.0	1.68775E-06	55.50824013	3.87468E-07	6.45779E-09	0.000124548	4.78384E-07	0.009875452	0.124547732
1145.0	1.68129E-06	55.50824013	3.85985E-07	6.43309E-09	0.000124071	4.76553E-07	0.009875929	0.124071179
1146.0	1.67486E-06	55.50824012	3.84508E-07	6.40847E-09	0.000123596	4.7473E-07	0.009876404	0.123596449
1147.0	1.66845E-06	55.50824011	3.83037E-07	6.38395E-09	0.000123124	4.72913E-07	0.009876876	0.123123536
1148.0	1.66207E-06	55.50824011	3.81571E-07	6.35952E-09	0.000122652	4.71104E-07	0.009877348	0.122652432
1149.0	1.65571E-06	55.5082401	3.80111E-07	6.33519E-09	0.000122183	4.69301E-07	0.009877817	0.12218313
1150.0	1.64937E-06	55.5082401	3.78657E-07	6.31095E-09	0.000121716	4.67506E-07	0.009878284	0.121715625
1151.0	1.64306E-06	55.50824009	3.77208E-07	6.2868E-09	0.00012125	4.65717E-07	0.00987875	0.121249908
1152.0	1.63678E-06	55.50824008	3.75765E-07	6.26275E-09	0.000120786	4.63935E-07	0.009879214	0.120785973
1153.0	1.63051E-06	55.50824008	3.74327E-07	6.23878E-09	0.000120324	4.6216E-07	0.009879676	0.120323813
1154.0	1.62427E-06	55.50824007	3.72895E-07	6.21491E-09	0.000119863	4.60391E-07	0.009880137	0.119863422
1155.0	1.61806E-06	55.50824006	3.71468E-07	6.19113E-09	0.000119405	4.5863E-07	0.009880595	0.119404792
1156.0	1.61187E-06	55.50824006	3.70047E-07	6.16744E-09	0.000118948	4.56875E-07	0.009881052	0.118947917
1157.0	1.6057E-06	55.50824005	3.68631E-07	6.14385E-09	0.000118493	4.55127E-07	0.009881507	0.11849279
1158.0	1.59956E-06	55.50824005	3.6722E-07	6.12034E-09	0.000118039	4.53385E-07	0.009881961	0.118039404
1159.0	1.59344E-06	55.50824004	3.65815E-07	6.09692E-09	0.000117588	4.51651E-07	0.009882412	0.117587754
1160.0	1.58734E-06	55.50824003	3.64415E-07	6.07359E-09	0.000117138	4.49923E-07	0.009882862	0.117137831
1161.0	1.58127E-06	55.50824003	3.63021E-07	6.05035E-09	0.00011669	4.48201E-07	0.00988331	0.11668963
1162.0	1.57522E-06	55.50824002	3.61632E-07	6.0272E-09	0.000116243	4.46486E-07	0.009883757	0.116243144
1163.0	1.56919E-06	55.50824002	3.60248E-07	6.00414E-09	0.000115798	4.44778E-07	0.009884202	0.115798366
1164.0	1.56318E-06	55.50824001	3.5887E-07	5.98117E-09	0.000115355	4.43076E-07	0.009884645	0.11535529
1165.0	1.5572E-06	55.50824	3.57497E-07	5.95828E-09	0.000114914	4.41381E-07	0.009885086	0.11491391
1166.0	1.55125E-06	55.50824	3.56129E-07	5.93548E-09	0.000114474	4.39692E-07	0.009885526	0.114474218
1167.0	1.54531E-06	55.50823999	3.54766E-07	5.91277E-09	0.000114036	4.38009E-07	0.009885964	0.114036209
1168.0	1.5394E-06	55.50823999	3.53409E-07	5.89015E-09	0.0001136	4.36333E-07	0.0098864	0.113599875
1169.0	1.53351E-06	55.50823998	3.52057E-07	5.86761E-09	0.000113165	4.34664E-07	0.009886835	0.113165212
1170.0	1.52764E-06	55.50823997	3.5071E-07	5.84516E-09	0.000112732	4.33001E-07	0.009887268	0.112732211
1171.0	1.52179E-06	55.50823997	3.49368E-07	5.8228E-09	0.000112301	4.31344E-07	0.009887699	0.112300867

1172.0	1.51597E-06	55.50823996	3.48031E-07	5.80052E-09	0.000111871	4.29693E-07	0.009888129	0.111871174
1173.0	1.51017E-06	55.50823996	3.46699E-07	5.77832E-09	0.000111443	4.28049E-07	0.009888557	0.111443124
1174.0	1.50439E-06	55.50823995	3.45373E-07	5.75621E-09	0.000111017	4.26412E-07	0.009888983	0.111016713
1175.0	1.49864E-06	55.50823994	3.44051E-07	5.73419E-09	0.000110592	4.2478E-07	0.009889408	0.110591933
1176.0	1.4929E-06	55.50823994	3.42735E-07	5.71225E-09	0.000110169	4.23155E-07	0.009889831	0.110168778
1177.0	1.48719E-06	55.50823993	3.41423E-07	5.69039E-09	0.000109747	4.21536E-07	0.009890253	0.109747243
1178.0	1.4815E-06	55.50823993	3.40117E-07	5.66862E-09	0.000109327	4.19923E-07	0.009890673	0.10932732
1179.0	1.47583E-06	55.50823992	3.38816E-07	5.64693E-09	0.000108909	4.18316E-07	0.009891091	0.108909004
1180.0	1.47018E-06	55.50823992	3.37519E-07	5.62532E-09	0.000108492	4.16715E-07	0.009891508	0.108492289
1181.0	1.46456E-06	55.50823991	3.36228E-07	5.6038E-09	0.000108077	4.15121E-07	0.009891923	0.108077168
1182.0	1.45895E-06	55.50823991	3.34941E-07	5.58235E-09	0.000107664	4.13532E-07	0.009892336	0.107663635
1183.0	1.45337E-06	55.5082399	3.3366E-07	5.561E-09	0.000107252	4.1195E-07	0.009892748	0.107251685
1184.0	1.44781E-06	55.50823989	3.32383E-07	5.53972E-09	0.000106841	4.10374E-07	0.009893159	0.106841311
1185.0	1.44227E-06	55.50823989	3.31111E-07	5.51852E-09	0.000106433	4.08804E-07	0.009893567	0.106432508
1186.0	1.43675E-06	55.50823988	3.29844E-07	5.49741E-09	0.000106025	4.0724E-07	0.009893975	0.106025268
1187.0	1.43126E-06	55.50823988	3.28582E-07	5.47637E-09	0.00010562	4.05681E-07	0.00989438	0.105619587
1188.0	1.42578E-06	55.50823987	3.27325E-07	5.45542E-09	0.000105215	4.04129E-07	0.009894785	0.105215458
1189.0	1.42032E-06	55.50823987	3.26073E-07	5.43454E-09	0.000104813	4.02583E-07	0.009895187	0.104812875
1190.0	1.41489E-06	55.50823986	3.24825E-07	5.41375E-09	0.000104412	4.01042E-07	0.009895588	0.104411832
1191.0	1.40948E-06	55.50823986	3.23582E-07	5.39303E-09	0.000104012	3.99508E-07	0.009895988	0.104012324
1192.0	1.40408E-06	55.50823985	3.22344E-07	5.3724E-09	0.000103614	3.97979E-07	0.009896386	0.103614345
1193.0	1.39871E-06	55.50823984	3.21111E-07	5.35184E-09	0.000103218	3.96457E-07	0.009896782	0.103217889
1194.0	1.39336E-06	55.50823984	3.19882E-07	5.33137E-09	0.000102823	3.9494E-07	0.009897177	0.102822949
1195.0	1.38803E-06	55.50823983	3.18658E-07	5.31097E-09	0.00010243	3.93428E-07	0.00989757	0.102429521
1196.0	1.38272E-06	55.50823983	3.17439E-07	5.29064E-09	0.000102038	3.91923E-07	0.009897962	0.102037598
1197.0	1.37743E-06	55.50823982	3.16224E-07	5.2704E-09	0.000101647	3.90423E-07	0.009898353	0.101647174
1198.0	1.37215E-06	55.50823982	3.15014E-07	5.25024E-09	0.000101258	3.8893E-07	0.009898742	0.101258245
1199.0	1.3669E-06	55.50823981	3.13809E-07	5.23015E-09	0.000100871	3.87441E-07	0.009899129	0.100870803
1200.0	1.36167E-06	55.50823981	3.12608E-07	5.21013E-09	0.000100485	3.85959E-07	0.009899515	0.100484844
1201.0	1.35646E-06	55.5082398	3.11412E-07	5.1902E-09	0.0001001	3.84482E-07	0.0098999	0.100100362
1202.0	1.35127E-06	55.5082398	3.1022E-07	5.17034E-09	9.97174E-05	3.83011E-07	0.009900283	0.099717351
1203.0	1.3461E-06	55.50823979	3.09033E-07	5.15056E-09	9.93358E-05	3.81546E-07	0.009900664	0.099335805
1204.0	1.34095E-06	55.50823979	3.07851E-07	5.13085E-09	9.89557E-05	3.80086E-07	0.009901044	0.09895572
1205.0	1.33582E-06	55.50823978	3.06673E-07	5.11122E-09	9.85771E-05	3.78631E-07	0.009901423	0.098577088
1206.0	1.33071E-06	55.50823978	3.055E-07	5.09166E-09	9.81999E-05	3.77183E-07	0.0099018	0.098199906
1207.0	1.32562E-06	55.50823977	3.04331E-07	5.07218E-09	9.78242E-05	3.75739E-07	0.009902176	0.097824166
1208.0	1.32055E-06	55.50823977	3.03166E-07	5.05277E-09	9.74499E-05	3.74302E-07	0.00990255	0.097449865
1209.0	1.31549E-06	55.50823976	3.02006E-07	5.03344E-09	9.7077E-05	3.7287E-07	0.009902923	0.097076995
1210.0	1.31046E-06	55.50823976	3.00851E-07	5.01418E-09	9.67056E-05	3.71443E-07	0.009903294	0.096705552
1211.0	1.30545E-06	55.50823975	2.997E-07	4.99499E-09	9.63355E-05	3.70022E-07	0.009903664	0.096335531
1212.0	1.30045E-06	55.50823975	2.98553E-07	4.97588E-09	9.59669E-05	3.68606E-07	0.009904033	0.095966925
1213.0	1.29548E-06	55.50823974	2.97411E-07	4.95684E-09	9.55997E-05	3.67195E-07	0.0099044	0.09559973
1214.0	1.29052E-06	55.50823974	2.96273E-07	4.93788E-09	9.52339E-05	3.6579E-07	0.009904766	0.095233939
1215.0	1.28558E-06	55.50823973	2.95139E-07	4.91898E-09	9.48695E-05	3.64391E-07	0.00990513	0.094869548
1216.0	1.28066E-06	55.50823973	2.9401E-07	4.90016E-09	9.45066E-05	3.62997E-07	0.009905493	0.094506552
1217.0	1.27576E-06	55.50823972	2.92885E-07	4.88141E-09	9.41449E-05	3.61608E-07	0.009905855	0.094144944
1218.0	1.27088E-06	55.50823972	2.91764E-07	4.86273E-09	9.37847E-05	3.60224E-07	0.009906215	0.09378472
1219.0	1.26602E-06	55.50823971	2.90648E-07	4.84413E-09	9.34259E-05	3.58846E-07	0.009906574	0.093425875

1220.0	1.26117E-06	55.50823971	2.89536E-07	4.82559E-09	9.30684E-05	3.57473E-07	0.009906932	0.093068402
1221.0	1.25635E-06	55.5082397	2.88428E-07	4.80713E-09	9.27123E-05	3.56105E-07	0.009907288	0.092712297
1222.0	1.25154E-06	55.5082397	2.87324E-07	4.78874E-09	9.23576E-05	3.54742E-07	0.009907642	0.092357555
1223.0	1.24675E-06	55.50823969	2.86225E-07	4.77041E-09	9.20042E-05	3.53385E-07	0.009907996	0.09200417
1224.0	1.24198E-06	55.50823969	2.8513E-07	4.75216E-09	9.16521E-05	3.52033E-07	0.009908348	0.091652137
1225.0	1.23723E-06	55.50823968	2.84039E-07	4.73398E-09	9.13015E-05	3.50686E-07	0.009908699	0.091301451
1226.0	1.2325E-06	55.50823968	2.82952E-07	4.71586E-09	9.09521E-05	3.49344E-07	0.009909048	0.090952107
1227.0	1.22778E-06	55.50823967	2.81869E-07	4.69782E-09	9.06041E-05	3.48007E-07	0.009909396	0.0906041
1228.0	1.22308E-06	55.50823967	2.80791E-07	4.67984E-09	9.02574E-05	3.46676E-07	0.009909743	0.090257424
1229.0	1.2184E-06	55.50823966	2.79716E-07	4.66194E-09	8.99121E-05	3.45349E-07	0.009910088	0.089912075
1230.0	1.21374E-06	55.50823966	2.78646E-07	4.6441E-09	8.9568E-05	3.44028E-07	0.009910432	0.089568047
1231.0	1.2091E-06	55.50823966	2.7758E-07	4.62633E-09	8.92253E-05	3.42712E-07	0.009910775	0.089225335
1232.0	1.20447E-06	55.50823965	2.76518E-07	4.60863E-09	8.88839E-05	3.414E-07	0.009911116	0.088883935
1233.0	1.19986E-06	55.50823965	2.7546E-07	4.59099E-09	8.85438E-05	3.40094E-07	0.009911456	0.088543841
1234.0	1.19527E-06	55.50823964	2.74406E-07	4.57343E-09	8.8205E-05	3.38793E-07	0.009911795	0.088205048
1235.0	1.1907E-06	55.50823964	2.73356E-07	4.55593E-09	8.78676E-05	3.37496E-07	0.009912132	0.087867552
1236.0	1.18614E-06	55.50823963	2.7231E-07	4.5385E-09	8.75313E-05	3.36205E-07	0.009912469	0.087531347
1237.0	1.1816E-06	55.50823963	2.71268E-07	4.52113E-09	8.71964E-05	3.34919E-07	0.009912804	0.087196428
1238.0	1.17708E-06	55.50823962	2.7023E-07	4.50383E-09	8.68628E-05	3.33637E-07	0.009913137	0.086862791
1239.0	1.17258E-06	55.50823962	2.69196E-07	4.4866E-09	8.65304E-05	3.32361E-07	0.00991347	0.086530431
1240.0	1.16809E-06	55.50823961	2.68166E-07	4.46943E-09	8.61993E-05	3.31089E-07	0.009913801	0.086199342
1241.0	1.16362E-06	55.50823961	2.6714E-07	4.45233E-09	8.58695E-05	3.29822E-07	0.00991413	0.08586952
1242.0	1.15917E-06	55.50823961	2.66118E-07	4.43529E-09	8.5541E-05	3.2856E-07	0.009914459	0.08554096
1243.0	1.15473E-06	55.5082396	2.65099E-07	4.41832E-09	8.52137E-05	3.27303E-07	0.009914786	0.085213657
1244.0	1.15032E-06	55.5082396	2.64085E-07	4.40142E-09	8.48876E-05	3.2605E-07	0.009915112	0.084887606
1245.0	1.14591E-06	55.50823959	2.63075E-07	4.38458E-09	8.45628E-05	3.24803E-07	0.009915437	0.084562803
1246.0	1.14153E-06	55.50823959	2.62068E-07	4.3678E-09	8.42392E-05	3.2356E-07	0.009915761	0.084239243
1247.0	1.13716E-06	55.50823958	2.61065E-07	4.35109E-09	8.39169E-05	3.22322E-07	0.009916083	0.083916921
1248.0	1.13281E-06	55.50823958	2.60066E-07	4.33444E-09	8.35958E-05	3.21089E-07	0.009916404	0.083595832
1249.0	1.12848E-06	55.50823957	2.59071E-07	4.31786E-09	8.3276E-05	3.1986E-07	0.009916724	0.083275972
1250.0	1.12416E-06	55.50823957	2.5808E-07	4.30133E-09	8.29573E-05	3.18636E-07	0.009917043	0.082957336
1251.0	1.11986E-06	55.50823957	2.57093E-07	4.28488E-09	8.26399E-05	3.17417E-07	0.00991736	0.082639919
1252.0	1.11557E-06	55.50823956	2.56109E-07	4.26848E-09	8.23237E-05	3.16203E-07	0.009917676	0.082323716
1253.0	1.1113E-06	55.50823956	2.55129E-07	4.25215E-09	8.20087E-05	3.14993E-07	0.009917991	0.082008723
1254.0	1.10705E-06	55.50823955	2.54153E-07	4.23588E-09	8.16949E-05	3.13788E-07	0.009918305	0.081694936
1255.0	1.10282E-06	55.50823955	2.5318E-07	4.21967E-09	8.13823E-05	3.12587E-07	0.009918618	0.081382349
1256.0	1.0986E-06	55.50823954	2.52212E-07	4.20353E-09	8.1071E-05	3.11391E-07	0.009918929	0.081070958
1257.0	1.09439E-06	55.50823954	2.51247E-07	4.18744E-09	8.07608E-05	3.10199E-07	0.009919239	0.080760758
1258.0	1.09021E-06	55.50823954	2.50285E-07	4.17142E-09	8.04517E-05	3.09012E-07	0.009919548	0.080451746
1259.0	1.08603E-06	55.50823953	2.49328E-07	4.15546E-09	8.01439E-05	3.0783E-07	0.009919856	0.080143916
1260.0	1.08188E-06	55.50823953	2.48374E-07	4.13956E-09	7.98373E-05	3.06652E-07	0.009920163	0.079837263
1261.0	1.07774E-06	55.50823952	2.47423E-07	4.12372E-09	7.95318E-05	3.05479E-07	0.009920468	0.079531784
1262.0	1.07361E-06	55.50823952	2.46476E-07	4.10794E-09	7.92275E-05	3.0431E-07	0.009920773	0.079227474
1263.0	1.06951E-06	55.50823952	2.45533E-07	4.09222E-09	7.89243E-05	3.03146E-07	0.009921076	0.078924329
1264.0	1.06541E-06	55.50823951	2.44594E-07	4.07657E-09	7.86223E-05	3.01986E-07	0.009921378	0.078622343
1265.0	1.06134E-06	55.50823951	2.43658E-07	4.06097E-09	7.83215E-05	3.0083E-07	0.009921678	0.078321512
1266.0	1.05728E-06	55.5082395	2.42726E-07	4.04543E-09	7.80218E-05	2.99679E-07	0.009921978	0.078021833
1267.0	1.05323E-06	55.5082395	2.41797E-07	4.02995E-09	7.77233E-05	2.98533E-07	0.009922277	0.077723301

1268.0	1.0492E-06	55.5082395	2.40872E-07	4.01453E-09	7.74259E-05	2.9739E-07	0.009922574	0.07742591
1269.0	1.04519E-06	55.50823949	2.3995E-07	3.99917E-09	7.71297E-05	2.96252E-07	0.00992287	0.077129658
1270.0	1.04119E-06	55.50823949	2.39032E-07	3.98387E-09	7.68345E-05	2.95119E-07	0.009923165	0.076834539
1271.0	1.0372E-06	55.50823948	2.38117E-07	3.96862E-09	7.65405E-05	2.9399E-07	0.009923459	0.076540549
1272.0	1.03324E-06	55.50823948	2.37206E-07	3.95344E-09	7.62477E-05	2.92865E-07	0.009923752	0.076247684
1273.0	1.02928E-06	55.50823948	2.36299E-07	3.93831E-09	7.59559E-05	2.91744E-07	0.009924044	0.07595594
1274.0	1.02534E-06	55.50823947	2.35395E-07	3.92324E-09	7.56653E-05	2.90628E-07	0.009924335	0.075665312
1275.0	1.02142E-06	55.50823947	2.34494E-07	3.90823E-09	7.53758E-05	2.89516E-07	0.009924624	0.075375796
1276.0	1.01751E-06	55.50823946	2.33597E-07	3.89328E-09	7.50874E-05	2.88408E-07	0.009924913	0.075087388
1277.0	1.01362E-06	55.50823946	2.32703E-07	3.87838E-09	7.48001E-05	2.87305E-07	0.0099252	0.074800083
1278.0	1.00974E-06	55.50823946	2.31812E-07	3.86354E-09	7.45139E-05	2.86205E-07	0.009925486	0.074513878
1279.0	1.00588E-06	55.50823945	2.30925E-07	3.84876E-09	7.42288E-05	2.8511E-07	0.009925771	0.074228768
1280.0	1.00203E-06	55.50823945	2.30042E-07	3.83403E-09	7.39447E-05	2.84019E-07	0.009926055	0.073944748
1281.0	9.98194E-07	55.50823944	2.29162E-07	3.81936E-09	7.36618E-05	2.82933E-07	0.009926338	0.073661816
1282.0	9.94375E-07	55.50823944	2.28285E-07	3.80475E-09	7.338E-05	2.8185E-07	0.00992662	0.073379966
1283.0	9.9057E-07	55.50823944	2.27411E-07	3.79019E-09	7.30992E-05	2.80772E-07	0.009926901	0.073099194
1284.0	9.8678E-07	55.50823943	2.26541E-07	3.77569E-09	7.28195E-05	2.79697E-07	0.009927181	0.072819497
1285.0	9.83004E-07	55.50823943	2.25674E-07	3.76124E-09	7.25409E-05	2.78627E-07	0.009927459	0.07254087
1286.0	9.79243E-07	55.50823943	2.24811E-07	3.74685E-09	7.22633E-05	2.77561E-07	0.009927737	0.072263309
1287.0	9.75496E-07	55.50823942	2.23951E-07	3.73251E-09	7.19868E-05	2.76499E-07	0.009928013	0.07198681
1288.0	9.71764E-07	55.50823942	2.23094E-07	3.71823E-09	7.17114E-05	2.75441E-07	0.009928289	0.071711369
1289.0	9.68046E-07	55.50823941	2.2224E-07	3.704E-09	7.1437E-05	2.74387E-07	0.009928563	0.071436982
1290.0	9.64342E-07	55.50823941	2.2139E-07	3.68983E-09	7.11636E-05	2.73337E-07	0.009928836	0.071163645
1291.0	9.60652E-07	55.50823941	2.20543E-07	3.67571E-09	7.08914E-05	2.72291E-07	0.009929109	0.070891353
1292.0	9.56976E-07	55.5082394	2.19699E-07	3.66165E-09	7.06201E-05	2.71249E-07	0.00992938	0.070620104
1293.0	9.53314E-07	55.5082394	2.18858E-07	3.64764E-09	7.03499E-05	2.70212E-07	0.00992965	0.070349892
1294.0	9.49667E-07	55.5082394	2.18021E-07	3.63368E-09	7.00807E-05	2.69178E-07	0.009929919	0.070080714
1295.0	9.46033E-07	55.50823939	2.17187E-07	3.61978E-09	6.98126E-05	2.68148E-07	0.009930187	0.069812567
1296.0	9.42413E-07	55.50823939	2.16356E-07	3.60593E-09	6.95454E-05	2.67122E-07	0.009930455	0.069545445
1297.0	9.38807E-07	55.50823939	2.15528E-07	3.59213E-09	6.92793E-05	2.661E-07	0.009930721	0.069279345
1298.0	9.35215E-07	55.50823938	2.14703E-07	3.57839E-09	6.90143E-05	2.65082E-07	0.009930986	0.069014264
1299.0	9.31637E-07	55.50823938	2.13882E-07	3.56469E-09	6.87502E-05	2.64067E-07	0.00993125	0.068750196
1300.0	9.28072E-07	55.50823937	2.13063E-07	3.55106E-09	6.84871E-05	2.63057E-07	0.009931513	0.06848714
1301.0	9.24521E-07	55.50823937	2.12248E-07	3.53747E-09	6.82251E-05	2.6205E-07	0.009931775	0.068225089
1302.0	9.20984E-07	55.50823937	2.11436E-07	3.52393E-09	6.7964E-05	2.61048E-07	0.009932036	0.067964042
1303.0	9.1746E-07	55.50823936	2.10627E-07	3.51045E-09	6.7704E-05	2.60049E-07	0.009932296	0.067703993
1304.0	9.13949E-07	55.50823936	2.09821E-07	3.49702E-09	6.74449E-05	2.59054E-07	0.009932555	0.067444939
1305.0	9.10452E-07	55.50823936	2.09018E-07	3.48364E-09	6.71869E-05	2.58063E-07	0.009932813	0.067186876
1306.0	9.06969E-07	55.50823935	2.08218E-07	3.47031E-09	6.69298E-05	2.57075E-07	0.00993307	0.066929801
1307.0	9.03498E-07	55.50823935	2.07422E-07	3.45703E-09	6.66737E-05	2.56092E-07	0.009933326	0.06667371
1308.0	9.00041E-07	55.50823935	2.06628E-07	3.4438E-09	6.64186E-05	2.55112E-07	0.009933581	0.066418598
1309.0	8.96598E-07	55.50823934	2.05837E-07	3.43062E-09	6.61645E-05	2.54136E-07	0.009933836	0.066164463
1310.0	8.93167E-07	55.50823934	2.0505E-07	3.4175E-09	6.59113E-05	2.53163E-07	0.009934089	0.0659113
1311.0	8.89749E-07	55.50823934	2.04265E-07	3.40442E-09	6.56591E-05	2.52194E-07	0.009934341	0.065659105
1312.0	8.86345E-07	55.50823933	2.03484E-07	3.3914E-09	6.54079E-05	2.51229E-07	0.009934592	0.065407876
1313.0	8.82954E-07	55.50823933	2.02705E-07	3.37842E-09	6.51576E-05	2.50268E-07	0.009934842	0.065157607
1314.0	8.79575E-07	55.50823933	2.0193E-07	3.36549E-09	6.49083E-05	2.49311E-07	0.009935092	0.064908297
1315.0	8.7621E-07	55.50823932	2.01157E-07	3.35262E-09	6.46599E-05	2.48357E-07	0.00993534	0.06465994

1316.0	8.72857E-07	55.50823932	2.00387E-07	3.33979E-09	6.44125E-05	2.47406E-07	0.009935587	0.064412534
1317.0	8.69517E-07	55.50823932	1.9962E-07	3.32701E-09	6.41661E-05	2.4646E-07	0.009935834	0.064166074
1318.0	8.6619E-07	55.50823931	1.98857E-07	3.31428E-09	6.39206E-05	2.45517E-07	0.009936079	0.063920557
1319.0	8.62876E-07	55.50823931	1.98096E-07	3.3016E-09	6.3676E-05	2.44577E-07	0.009936324	0.06367598
1320.0	8.59574E-07	55.50823931	1.97338E-07	3.28896E-09	6.34323E-05	2.43642E-07	0.009936568	0.063432338
1321.0	8.56285E-07	55.5082393	1.96583E-07	3.27638E-09	6.31896E-05	2.42709E-07	0.00993681	0.063189629
1322.0	8.53009E-07	55.5082393	1.95831E-07	3.26384E-09	6.29478E-05	2.41781E-07	0.009937052	0.062947848
1323.0	8.49745E-07	55.5082393	1.95081E-07	3.25135E-09	6.2707E-05	2.40855E-07	0.009937293	0.062706993
1324.0	8.46494E-07	55.50823929	1.94335E-07	3.23891E-09	6.24671E-05	2.39934E-07	0.009937533	0.062467059
1325.0	8.43255E-07	55.50823929	1.93591E-07	3.22652E-09	6.2228E-05	2.39016E-07	0.009937772	0.062228043
1326.0	8.40028E-07	55.50823929	1.92851E-07	3.21418E-09	6.19899E-05	2.38101E-07	0.00993801	0.061989942
1327.0	8.36814E-07	55.50823928	1.92113E-07	3.20188E-09	6.17528E-05	2.3719E-07	0.009938247	0.061752752
1328.0	8.33612E-07	55.50823928	1.91378E-07	3.18963E-09	6.15165E-05	2.36283E-07	0.009938484	0.061516469
1329.0	8.30423E-07	55.50823928	1.90645E-07	3.17742E-09	6.12811E-05	2.35379E-07	0.009938719	0.06128109
1330.0	8.27245E-07	55.50823927	1.89916E-07	3.16526E-09	6.10466E-05	2.34478E-07	0.009938953	0.061046612
1331.0	8.2408E-07	55.50823927	1.89189E-07	3.15315E-09	6.0813E-05	2.33581E-07	0.009939187	0.060813031
1332.0	8.20927E-07	55.50823927	1.88465E-07	3.14109E-09	6.05803E-05	2.32687E-07	0.00993942	0.060580344
1333.0	8.17786E-07	55.50823926	1.87744E-07	3.12907E-09	6.03485E-05	2.31797E-07	0.009939651	0.060348547
1334.0	8.14657E-07	55.50823926	1.87026E-07	3.1171E-09	6.01176E-05	2.3091E-07	0.009939882	0.060117638
1335.0	8.1154E-07	55.50823926	1.8631E-07	3.10517E-09	5.98876E-05	2.30026E-07	0.009940112	0.059887611
1336.0	8.08434E-07	55.50823925	1.85597E-07	3.09329E-09	5.96585E-05	2.29146E-07	0.009940342	0.059658465
1337.0	8.05341E-07	55.50823925	1.84887E-07	3.08145E-09	5.94302E-05	2.28269E-07	0.00994057	0.059430196
1338.0	8.0226E-07	55.50823925	1.8418E-07	3.06966E-09	5.92028E-05	2.27396E-07	0.009940797	0.0592028
1339.0	7.9919E-07	55.50823925	1.83475E-07	3.05792E-09	5.89763E-05	2.26526E-07	0.009941024	0.058976274
1340.0	7.96132E-07	55.50823924	1.82773E-07	3.04622E-09	5.87506E-05	2.25659E-07	0.009941249	0.058750615
1341.0	7.93086E-07	55.50823924	1.82074E-07	3.03456E-09	5.85258E-05	2.24796E-07	0.009941474	0.058525819
1342.0	7.90051E-07	55.50823924	1.81377E-07	3.02295E-09	5.83019E-05	2.23936E-07	0.009941698	0.058301883
1343.0	7.87028E-07	55.50823923	1.80683E-07	3.01138E-09	5.80788E-05	2.23079E-07	0.009941921	0.058078804
1344.0	7.84017E-07	55.50823923	1.79992E-07	2.99986E-09	5.78566E-05	2.22225E-07	0.009942143	0.057856579
1345.0	7.81017E-07	55.50823923	1.79303E-07	2.98838E-09	5.76352E-05	2.21375E-07	0.009942365	0.057635204
1346.0	7.78029E-07	55.50823922	1.78617E-07	2.97695E-09	5.74147E-05	2.20528E-07	0.009942585	0.057414676
1347.0	7.75052E-07	55.50823922	1.77933E-07	2.96556E-09	5.7195E-05	2.19684E-07	0.009942805	0.057194992
1348.0	7.72086E-07	55.50823922	1.77253E-07	2.95421E-09	5.69761E-05	2.18844E-07	0.009943024	0.056976149
1349.0	7.69132E-07	55.50823922	1.76574E-07	2.94291E-09	5.67581E-05	2.18006E-07	0.009943242	0.056758143
1350.0	7.66189E-07	55.50823921	1.75899E-07	2.93165E-09	5.6541E-05	2.17172E-07	0.009943459	0.056540971
1351.0	7.63258E-07	55.50823921	1.75226E-07	2.92043E-09	5.63246E-05	2.16341E-07	0.009943675	0.05632463
1352.0	7.60337E-07	55.50823921	1.74555E-07	2.90926E-09	5.61091E-05	2.15513E-07	0.009943891	0.056109116
1353.0	7.57428E-07	55.5082392	1.73887E-07	2.89812E-09	5.58944E-05	2.14689E-07	0.009944106	0.055894428
1354.0	7.5453E-07	55.5082392	1.73222E-07	2.88703E-09	5.56806E-05	2.13867E-07	0.009944319	0.055680561
1355.0	7.51643E-07	55.5082392	1.72559E-07	2.87599E-09	5.54675E-05	2.13049E-07	0.009944532	0.055467512
1356.0	7.48767E-07	55.50823919	1.71899E-07	2.86498E-09	5.52553E-05	2.12234E-07	0.009944745	0.055255278
1357.0	7.45902E-07	55.50823919	1.71241E-07	2.85402E-09	5.50439E-05	2.11422E-07	0.009944956	0.055043856
1358.0	7.43048E-07	55.50823919	1.70586E-07	2.8431E-09	5.48332E-05	2.10613E-07	0.009945167	0.054833244
1359.0	7.40205E-07	55.50823919	1.69933E-07	2.83222E-09	5.46234E-05	2.09807E-07	0.009945377	0.054623437
1360.0	7.37372E-07	55.50823918	1.69283E-07	2.82139E-09	5.44144E-05	2.09004E-07	0.009945586	0.054414433
1361.0	7.34551E-07	55.50823918	1.68635E-07	2.81059E-09	5.42062E-05	2.08204E-07	0.009945794	0.054206229
1362.0	7.3174E-07	55.50823918	1.6799E-07	2.79984E-09	5.39988E-05	2.07408E-07	0.009946001	0.053998821
1363.0	7.28941E-07	55.50823918	1.67347E-07	2.78912E-09	5.37922E-05	2.06614E-07	0.009946208	0.053792207

1364.0	7.26151E-07	55.50823917	1.66707E-07	2.77845E-09	5.35864E-05	2.05824E-07	0.009946414	0.053586383
1365.0	7.23373E-07	55.50823917	1.66069E-07	2.76782E-09	5.33813E-05	2.05036E-07	0.009946619	0.053381347
1366.0	7.20605E-07	55.50823917	1.65434E-07	2.75723E-09	5.31771E-05	2.04251E-07	0.009946823	0.053177096
1367.0	7.17848E-07	55.50823916	1.64801E-07	2.74668E-09	5.29736E-05	2.0347E-07	0.009947026	0.052973626
1368.0	7.15101E-07	55.50823916	1.6417E-07	2.73617E-09	5.27709E-05	2.02691E-07	0.009947229	0.052770934
1369.0	7.12365E-07	55.50823916	1.63542E-07	2.7257E-09	5.2569E-05	2.01916E-07	0.009947431	0.052569019
1370.0	7.09639E-07	55.50823916	1.62916E-07	2.71527E-09	5.23679E-05	2.01143E-07	0.009947632	0.052367875
1371.0	7.06924E-07	55.50823915	1.62293E-07	2.70488E-09	5.21675E-05	2.00374E-07	0.009947832	0.052167502
1372.0	7.04219E-07	55.50823915	1.61672E-07	2.69453E-09	5.19679E-05	1.99607E-07	0.009948032	0.051967895
1373.0	7.01525E-07	55.50823915	1.61053E-07	2.68422E-09	5.17691E-05	1.98843E-07	0.009948231	0.051769051
1374.0	6.9884E-07	55.50823915	1.60437E-07	2.67395E-09	5.1571E-05	1.98082E-07	0.009948429	0.051570969
1375.0	6.96166E-07	55.50823914	1.59823E-07	2.66372E-09	5.13736E-05	1.97324E-07	0.009948626	0.051373645
1376.0	6.93503E-07	55.50823914	1.59212E-07	2.65353E-09	5.11771E-05	1.96569E-07	0.009948823	0.051177075
1377.0	6.90849E-07	55.50823914	1.58603E-07	2.64338E-09	5.09813E-05	1.95817E-07	0.009949019	0.050981258
1378.0	6.88206E-07	55.50823913	1.57996E-07	2.63326E-09	5.07862E-05	1.95068E-07	0.009949214	0.05078619
1379.0	6.85573E-07	55.50823913	1.57391E-07	2.62319E-09	5.05919E-05	1.94322E-07	0.009949408	0.050591868
1380.0	6.82949E-07	55.50823913	1.56789E-07	2.61315E-09	5.03983E-05	1.93578E-07	0.009949602	0.05039829
1381.0	6.80336E-07	55.50823913	1.56189E-07	2.60315E-09	5.02055E-05	1.92837E-07	0.009949795	0.050205452
1382.0	6.77733E-07	55.50823912	1.55591E-07	2.59319E-09	5.00134E-05	1.921E-07	0.009949987	0.050013353
1383.0	6.7514E-07	55.50823912	1.54996E-07	2.58327E-09	4.9822E-05	1.91365E-07	0.009950178	0.049821988
1384.0	6.72557E-07	55.50823912	1.54403E-07	2.57338E-09	4.96314E-05	1.90632E-07	0.009950369	0.049631356
1385.0	6.69983E-07	55.50823912	1.53812E-07	2.56354E-09	4.94415E-05	1.89903E-07	0.009950559	0.049441453
1386.0	6.6742E-07	55.50823911	1.53224E-07	2.55373E-09	4.92523E-05	1.89176E-07	0.009950748	0.049252276
1387.0	6.64866E-07	55.50823911	1.52637E-07	2.54396E-09	4.90638E-05	1.88453E-07	0.009950936	0.049063824
1388.0	6.62322E-07	55.50823911	1.52053E-07	2.53422E-09	4.88761E-05	1.87731E-07	0.009951124	0.048876092
1389.0	6.59788E-07	55.50823911	1.51472E-07	2.52453E-09	4.86891E-05	1.87013E-07	0.009951311	0.048689079
1390.0	6.57263E-07	55.5082391	1.50892E-07	2.51487E-09	4.85028E-05	1.86298E-07	0.009951497	0.048502782
1391.0	6.54748E-07	55.5082391	1.50315E-07	2.50524E-09	4.83172E-05	1.85585E-07	0.009951683	0.048317197
1392.0	6.52243E-07	55.5082391	1.4974E-07	2.49566E-09	4.81323E-05	1.84875E-07	0.009951868	0.048132322
1393.0	6.49748E-07	55.5082391	1.49167E-07	2.48611E-09	4.79482E-05	1.84167E-07	0.009952052	0.047948155
1394.0	6.47261E-07	55.50823909	1.48596E-07	2.4766E-09	4.77647E-05	1.83463E-07	0.009952235	0.047764692
1395.0	6.44785E-07	55.50823909	1.48027E-07	2.46712E-09	4.75819E-05	1.82761E-07	0.009952418	0.047581932
1396.0	6.42318E-07	55.50823909	1.47461E-07	2.45768E-09	4.73999E-05	1.82061E-07	0.0099526	0.04739987
1397.0	6.3986E-07	55.50823909	1.46897E-07	2.44828E-09	4.72185E-05	1.81365E-07	0.009952781	0.047218506
1398.0	6.37412E-07	55.50823908	1.46335E-07	2.43891E-09	4.70378E-05	1.80671E-07	0.009952962	0.047037835
1399.0	6.34973E-07	55.50823908	1.45775E-07	2.42958E-09	4.68579E-05	1.79979E-07	0.009953142	0.046857856
1400.0	6.32543E-07	55.50823908	1.45217E-07	2.42028E-09	4.66786E-05	1.79291E-07	0.009953321	0.046678565
1401.0	6.30123E-07	55.50823908	1.44661E-07	2.41102E-09	4.65E-05	1.78605E-07	0.0099535	0.04649996
1402.0	6.27712E-07	55.50823907	1.44108E-07	2.4018E-09	4.6322E-05	1.77921E-07	0.009953678	0.046322038
1403.0	6.2531E-07	55.50823907	1.43556E-07	2.39261E-09	4.61448E-05	1.77241E-07	0.009953855	0.046144798
1404.0	6.22918E-07	55.50823907	1.43007E-07	2.38345E-09	4.59682E-05	1.76562E-07	0.009954032	0.045968235
1405.0	6.20534E-07	55.50823907	1.4246E-07	2.37433E-09	4.57923E-05	1.75887E-07	0.009954208	0.045792348
1406.0	6.1816E-07	55.50823906	1.41915E-07	2.36525E-09	4.56171E-05	1.75214E-07	0.009954383	0.045617135
1407.0	6.15795E-07	55.50823906	1.41372E-07	2.3562E-09	4.54426E-05	1.74543E-07	0.009954557	0.045442591
1408.0	6.13438E-07	55.50823906	1.40831E-07	2.34718E-09	4.52687E-05	1.73876E-07	0.009954731	0.045268715
1409.0	6.11091E-07	55.50823906	1.40292E-07	2.3382E-09	4.50955E-05	1.7321E-07	0.009954904	0.045095505
1410.0	6.08753E-07	55.50823905	1.39755E-07	2.32925E-09	4.4923E-05	1.72548E-07	0.009955077	0.044922957
1411.0	6.06424E-07	55.50823905	1.3922E-07	2.32034E-09	4.47511E-05	1.71887E-07	0.009955249	0.04475107

1412.0	6.04103E-07	55.50823905	1.38688E-07	2.31146E-09	4.45798E-05	1.7123E-07	0.00995542	0.04457984
1413.0	6.01792E-07	55.50823905	1.38157E-07	2.30262E-09	4.44093E-05	1.70575E-07	0.009955591	0.044409266
1414.0	5.99489E-07	55.50823905	1.37628E-07	2.29381E-09	4.42393E-05	1.69922E-07	0.009955761	0.044239344
1415.0	5.97195E-07	55.50823904	1.37102E-07	2.28503E-09	4.40701E-05	1.69272E-07	0.00995593	0.044070072
1416.0	5.9491E-07	55.50823904	1.36577E-07	2.27629E-09	4.39014E-05	1.68624E-07	0.009956099	0.043901448
1417.0	5.92634E-07	55.50823904	1.36055E-07	2.26758E-09	4.37335E-05	1.67979E-07	0.009956267	0.04373347
1418.0	5.90367E-07	55.50823904	1.35534E-07	2.2589E-09	4.35661E-05	1.67336E-07	0.009956434	0.043566133
1419.0	5.88108E-07	55.50823903	1.35016E-07	2.25026E-09	4.33994E-05	1.66696E-07	0.009956601	0.043399438
1420.0	5.85857E-07	55.50823903	1.34499E-07	2.24165E-09	4.32334E-05	1.66058E-07	0.009956767	0.04323338
1421.0	5.83616E-07	55.50823903	1.33984E-07	2.23307E-09	4.3068E-05	1.65423E-07	0.009956932	0.043067957
1422.0	5.81383E-07	55.50823903	1.33472E-07	2.22453E-09	4.29032E-05	1.6479E-07	0.009957097	0.042903167
1423.0	5.79158E-07	55.50823903	1.32961E-07	2.21602E-09	4.2739E-05	1.64159E-07	0.009957261	0.042739008
1424.0	5.76942E-07	55.50823902	1.32452E-07	2.20754E-09	4.25755E-05	1.63531E-07	0.009957425	0.042575477
1425.0	5.74735E-07	55.50823902	1.31945E-07	2.19909E-09	4.24126E-05	1.62905E-07	0.009957587	0.042412572
1426.0	5.72536E-07	55.50823902	1.31441E-07	2.19068E-09	4.22503E-05	1.62282E-07	0.00995775	0.04225029
1427.0	5.70345E-07	55.50823902	1.30938E-07	2.18229E-09	4.20886E-05	1.61661E-07	0.009957911	0.042088629
1428.0	5.68163E-07	55.50823901	1.30437E-07	2.17394E-09	4.19276E-05	1.61042E-07	0.009958072	0.041927587
1429.0	5.65989E-07	55.50823901	1.29938E-07	2.16563E-09	4.17672E-05	1.60426E-07	0.009958233	0.04176716
1430.0	5.63823E-07	55.50823901	1.2944E-07	2.15734E-09	4.16073E-05	1.59812E-07	0.009958393	0.041607348
1431.0	5.61666E-07	55.50823901	1.28945E-07	2.14908E-09	4.14481E-05	1.59201E-07	0.009958552	0.041448147
1432.0	5.59517E-07	55.50823901	1.28452E-07	2.14086E-09	4.12896E-05	1.58592E-07	0.00995871	0.041289555
1433.0	5.57376E-07	55.508239	1.2796E-07	2.13267E-09	4.11316E-05	1.57985E-07	0.009958868	0.04113157
1434.0	5.55243E-07	55.508239	1.27471E-07	2.12451E-09	4.09742E-05	1.57381E-07	0.009959026	0.04097419
1435.0	5.53119E-07	55.508239	1.26983E-07	2.11638E-09	4.08174E-05	1.56778E-07	0.009959183	0.040817411
1436.0	5.51002E-07	55.508239	1.26497E-07	2.10828E-09	4.06612E-05	1.56178E-07	0.009959339	0.040661233
1437.0	5.48894E-07	55.508239	1.26013E-07	2.10022E-09	4.05057E-05	1.55581E-07	0.009959494	0.040505652
1438.0	5.46794E-07	55.50823899	1.25531E-07	2.09218E-09	4.03507E-05	1.54986E-07	0.009959649	0.040350666
1439.0	5.44701E-07	55.50823899	1.25051E-07	2.08418E-09	4.01963E-05	1.54393E-07	0.009959804	0.040196274
1440.0	5.42617E-07	55.50823899	1.24572E-07	2.0762E-09	4.00425E-05	1.53802E-07	0.009959958	0.040042472
1441.0	5.40541E-07	55.50823899	1.24095E-07	2.06826E-09	3.98893E-05	1.53213E-07	0.009960111	0.039889259
1442.0	5.38473E-07	55.50823898	1.23621E-07	2.06034E-09	3.97366E-05	1.52627E-07	0.009960263	0.039736632
1443.0	5.36412E-07	55.50823898	1.23148E-07	2.05246E-09	3.95846E-05	1.52043E-07	0.009960415	0.039584588
1444.0	5.3436E-07	55.50823898	1.22676E-07	2.04461E-09	3.94331E-05	1.51461E-07	0.009960567	0.039433127
1445.0	5.32315E-07	55.50823898	1.22207E-07	2.03678E-09	3.92822E-05	1.50882E-07	0.009960718	0.039282245
1446.0	5.30279E-07	55.50823898	1.21739E-07	2.02899E-09	3.91319E-05	1.50304E-07	0.009960868	0.039131941
1447.0	5.2825E-07	55.50823897	1.21274E-07	2.02123E-09	3.89822E-05	1.49729E-07	0.009961018	0.038982211
1448.0	5.26228E-07	55.50823897	1.2081E-07	2.01349E-09	3.88331E-05	1.49156E-07	0.009961167	0.038833055
1449.0	5.24215E-07	55.50823897	1.20347E-07	2.00579E-09	3.86845E-05	1.48586E-07	0.009961316	0.038684469
1450.0	5.22209E-07	55.50823897	1.19887E-07	1.99811E-09	3.85365E-05	1.48017E-07	0.009961464	0.038536452
1451.0	5.20211E-07	55.50823897	1.19428E-07	1.99047E-09	3.8389E-05	1.47451E-07	0.009961611	0.038389001
1452.0	5.18221E-07	55.50823896	1.18971E-07	1.98285E-09	3.82421E-05	1.46887E-07	0.009961758	0.038242114
1453.0	5.16238E-07	55.50823896	1.18516E-07	1.97526E-09	3.80958E-05	1.46325E-07	0.009961904	0.03809579
1454.0	5.14262E-07	55.50823896	1.18062E-07	1.96771E-09	3.795E-05	1.45765E-07	0.00996205	0.037950025
1455.0	5.12295E-07	55.50823896	1.17611E-07	1.96018E-09	3.78048E-05	1.45207E-07	0.009962195	0.037804818
1456.0	5.10335E-07	55.50823896	1.17161E-07	1.95268E-09	3.76602E-05	1.44651E-07	0.00996234	0.037660166
1457.0	5.08382E-07	55.50823895	1.16712E-07	1.94521E-09	3.75161E-05	1.44098E-07	0.009962484	0.037516068
1458.0	5.06437E-07	55.50823895	1.16266E-07	1.93776E-09	3.73725E-05	1.43547E-07	0.009962627	0.037372522
1459.0	5.04499E-07	55.50823895	1.15821E-07	1.93035E-09	3.72295E-05	1.42997E-07	0.00996277	0.037229524

1460.0	5.02569E-07	55.50823895	1.15378E-07	1.92296E-09	3.70871E-05	1.4245E-07	0.009962913	0.037087074
1461.0	5.00646E-07	55.50823895	1.14936E-07	1.91561E-09	3.69452E-05	1.41905E-07	0.009963055	0.036945169
1462.0	4.9873E-07	55.50823894	1.14497E-07	1.90828E-09	3.68038E-05	1.41362E-07	0.009963196	0.036803807
1463.0	4.96822E-07	55.50823894	1.14058E-07	1.90097E-09	3.6663E-05	1.40821E-07	0.009963337	0.036662986
1464.0	4.94921E-07	55.50823894	1.13622E-07	1.8937E-09	3.65227E-05	1.40282E-07	0.009963477	0.036522703
1465.0	4.93027E-07	55.50823894	1.13187E-07	1.88645E-09	3.6383E-05	1.39746E-07	0.009963617	0.036382957
1466.0	4.91141E-07	55.50823894	1.12754E-07	1.87924E-09	3.62437E-05	1.39211E-07	0.009963756	0.036243746
1467.0	4.89261E-07	55.50823894	1.12323E-07	1.87205E-09	3.61051E-05	1.38678E-07	0.009963895	0.036105068
1468.0	4.87389E-07	55.50823893	1.11893E-07	1.86488E-09	3.59669E-05	1.38148E-07	0.009964033	0.03596692
1469.0	4.85524E-07	55.50823893	1.11465E-07	1.85775E-09	3.58293E-05	1.37619E-07	0.009964171	0.035829301
1470.0	4.83667E-07	55.50823893	1.11038E-07	1.85064E-09	3.56922E-05	1.37093E-07	0.009964308	0.035692208
1471.0	4.81816E-07	55.50823893	1.10614E-07	1.84356E-09	3.55556E-05	1.36568E-07	0.009964444	0.03555564
1472.0	4.79972E-07	55.50823893	1.1019E-07	1.8365E-09	3.54196E-05	1.36045E-07	0.00996458	0.035419595
1473.0	4.78136E-07	55.50823892	1.09769E-07	1.82948E-09	3.52841E-05	1.35525E-07	0.009964716	0.03528407
1474.0	4.76306E-07	55.50823892	1.09349E-07	1.82248E-09	3.51491E-05	1.35006E-07	0.009964851	0.035149064
1475.0	4.74484E-07	55.50823892	1.0893E-07	1.8155E-09	3.50146E-05	1.3449E-07	0.009964985	0.035014574
1476.0	4.72669E-07	55.50823892	1.08513E-07	1.80856E-09	3.48806E-05	1.33975E-07	0.009965119	0.034880598
1477.0	4.7086E-07	55.50823892	1.08098E-07	1.80164E-09	3.47471E-05	1.33463E-07	0.009965253	0.034747136
1478.0	4.69058E-07	55.50823892	1.07685E-07	1.79474E-09	3.46142E-05	1.32952E-07	0.009965386	0.034614184
1479.0	4.67264E-07	55.50823891	1.07273E-07	1.78788E-09	3.44817E-05	1.32443E-07	0.009965518	0.034481741
1480.0	4.65476E-07	55.50823891	1.06862E-07	1.78104E-09	3.43498E-05	1.31936E-07	0.00996565	0.034349804
1481.0	4.63695E-07	55.50823891	1.06453E-07	1.77422E-09	3.42184E-05	1.31432E-07	0.009965782	0.034218373
1482.0	4.6192E-07	55.50823891	1.06046E-07	1.76743E-09	3.40874E-05	1.30929E-07	0.009965913	0.034087444
1483.0	4.60153E-07	55.50823891	1.0564E-07	1.76067E-09	3.3957E-05	1.30428E-07	0.009966043	0.033957016
1484.0	4.58392E-07	55.5082389	1.05236E-07	1.75393E-09	3.38271E-05	1.29929E-07	0.009966173	0.033827087
1485.0	4.56638E-07	55.5082389	1.04833E-07	1.74722E-09	3.36977E-05	1.29432E-07	0.009966302	0.033697656
1486.0	4.54891E-07	55.5082389	1.04432E-07	1.74054E-09	3.35687E-05	1.28936E-07	0.009966431	0.033568719
1487.0	4.53151E-07	55.5082389	1.04033E-07	1.73388E-09	3.34403E-05	1.28443E-07	0.00996656	0.033440276
1488.0	4.51417E-07	55.5082389	1.03635E-07	1.72724E-09	3.33123E-05	1.27952E-07	0.009966688	0.033312325
1489.0	4.4969E-07	55.5082389	1.03238E-07	1.72063E-09	3.31849E-05	1.27462E-07	0.009966815	0.033184863
1490.0	4.47969E-07	55.50823889	1.02843E-07	1.71405E-09	3.30579E-05	1.26974E-07	0.009966942	0.033057889
1491.0	4.46255E-07	55.50823889	1.02449E-07	1.70749E-09	3.29314E-05	1.26488E-07	0.009967069	0.0329314
1492.0	4.44547E-07	55.50823889	1.02057E-07	1.70096E-09	3.28054E-05	1.26004E-07	0.009967195	0.032805396
1493.0	4.42846E-07	55.50823889	1.01667E-07	1.69445E-09	3.26799E-05	1.25522E-07	0.00996732	0.032679874
1494.0	4.41152E-07	55.50823889	1.01278E-07	1.68797E-09	3.25548E-05	1.25042E-07	0.009967445	0.032554831
1495.0	4.39464E-07	55.50823889	1.0089E-07	1.68151E-09	3.24303E-05	1.24564E-07	0.00996757	0.032430268
1496.0	4.37782E-07	55.50823888	1.00504E-07	1.67507E-09	3.23062E-05	1.24087E-07	0.009967694	0.032306181
1497.0	4.36107E-07	55.50823888	1.0012E-07	1.66866E-09	3.21826E-05	1.23612E-07	0.009967817	0.032182569
1498.0	4.34439E-07	55.50823888	9.97368E-08	1.66228E-09	3.20594E-05	1.23139E-07	0.009967941	0.03205943
1499.0	4.32776E-07	55.50823888	9.93552E-08	1.65592E-09	3.19368E-05	1.22668E-07	0.009968063	0.031936762
1500.0	4.31121E-07	55.50823888	9.8975E-08	1.64958E-09	3.18146E-05	1.22199E-07	0.009968185	0.031814563
1501.0	4.29471E-07	55.50823888	9.85963E-08	1.64327E-09	3.16928E-05	1.21731E-07	0.009968307	0.031692832
1502.0	4.27828E-07	55.50823887	9.82191E-08	1.63698E-09	3.15716E-05	1.21265E-07	0.009968428	0.031571566
1503.0	4.26191E-07	55.50823887	9.78432E-08	1.63072E-09	3.14508E-05	1.20801E-07	0.009968549	0.031450765
1504.0	4.2456E-07	55.50823887	9.74689E-08	1.62448E-09	3.13304E-05	1.20339E-07	0.00996867	0.031330426
1505.0	4.22935E-07	55.50823887	9.70959E-08	1.61827E-09	3.12105E-05	1.19879E-07	0.009968789	0.031210547
1506.0	4.21317E-07	55.50823887	9.67244E-08	1.61207E-09	3.10911E-05	1.1942E-07	0.009968909	0.031091127
1507.0	4.19705E-07	55.50823887	9.63543E-08	1.60591E-09	3.09722E-05	1.18963E-07	0.009969028	0.030972164

1508.0	4.18099E-07	55.50823886	9.59856E-08	1.59976E-09	3.08537E-05	1.18508E-07	0.009969146	0.030853656
1509.0	4.16499E-07	55.50823886	9.56184E-08	1.59364E-09	3.07356E-05	1.18054E-07	0.009969264	0.030735602
1510.0	4.14906E-07	55.50823886	9.52525E-08	1.58754E-09	3.0618E-05	1.17603E-07	0.009969382	0.030617999
1511.0	4.13318E-07	55.50823886	9.48881E-08	1.58147E-09	3.05008E-05	1.17153E-07	0.009969499	0.030500846
1512.0	4.11737E-07	55.50823886	9.4525E-08	1.57542E-09	3.03841E-05	1.16704E-07	0.009969616	0.030384142
1513.0	4.10161E-07	55.50823886	9.41633E-08	1.56939E-09	3.02679E-05	1.16258E-07	0.009969732	0.030267884
1514.0	4.08592E-07	55.50823885	9.3803E-08	1.56338E-09	3.01521E-05	1.15813E-07	0.009969848	0.030152071
1515.0	4.07029E-07	55.50823885	9.34441E-08	1.5574E-09	3.00367E-05	1.1537E-07	0.009969963	0.030036701
1516.0	4.05471E-07	55.50823885	9.30866E-08	1.55144E-09	2.99218E-05	1.14929E-07	0.009970078	0.029921772
1517.0	4.0392E-07	55.50823885	9.27304E-08	1.54551E-09	2.98073E-05	1.14489E-07	0.009970193	0.029807284
1518.0	4.02374E-07	55.50823885	9.23756E-08	1.53959E-09	2.96932E-05	1.14051E-07	0.009970307	0.029693233
1519.0	4.00835E-07	55.50823885	9.20221E-08	1.5337E-09	2.95796E-05	1.13614E-07	0.00997042	0.029579618
1520.0	3.99301E-07	55.50823885	9.167E-08	1.52783E-09	2.94664E-05	1.1318E-07	0.009970534	0.029466439
1521.0	3.97773E-07	55.50823884	9.13193E-08	1.52199E-09	2.93537E-05	1.12747E-07	0.009970646	0.029353692
1522.0	3.96251E-07	55.50823884	9.09698E-08	1.51616E-09	2.92414E-05	1.12315E-07	0.009970759	0.029241377
1523.0	3.94735E-07	55.50823884	9.06218E-08	1.51036E-09	2.91295E-05	1.11885E-07	0.009970871	0.029129492
1524.0	3.93225E-07	55.50823884	9.0275E-08	1.50458E-09	2.9018E-05	1.11457E-07	0.009970982	0.029018034
1525.0	3.9172E-07	55.50823884	8.99296E-08	1.49883E-09	2.8907E-05	1.11031E-07	0.009971093	0.028907004
1526.0	3.90221E-07	55.50823884	8.95855E-08	1.49309E-09	2.87964E-05	1.10606E-07	0.009971204	0.028796398
1527.0	3.88728E-07	55.50823883	8.92427E-08	1.48738E-09	2.86862E-05	1.10183E-07	0.009971314	0.028686215
1528.0	3.87241E-07	55.50823883	8.89013E-08	1.48169E-09	2.85765E-05	1.09761E-07	0.009971424	0.028576454
1529.0	3.85759E-07	55.50823883	8.85611E-08	1.47602E-09	2.84671E-05	1.09341E-07	0.009971533	0.028467112
1530.0	3.84283E-07	55.50823883	8.82223E-08	1.47037E-09	2.83582E-05	1.08923E-07	0.009971642	0.028358189
1531.0	3.82813E-07	55.50823883	8.78847E-08	1.46474E-09	2.82497E-05	1.08506E-07	0.00997175	0.028249683
1532.0	3.81348E-07	55.50823883	8.75484E-08	1.45914E-09	2.81416E-05	1.08091E-07	0.009971858	0.028141592
1533.0	3.79889E-07	55.50823883	8.72134E-08	1.45356E-09	2.80339E-05	1.07677E-07	0.009971966	0.028033915
1534.0	3.78435E-07	55.50823882	8.68797E-08	1.448E-09	2.79266E-05	1.07265E-07	0.009972073	0.02792665
1535.0	3.76987E-07	55.50823882	8.65473E-08	1.44246E-09	2.78198E-05	1.06855E-07	0.00997218	0.027819795
1536.0	3.75545E-07	55.50823882	8.62162E-08	1.43694E-09	2.77133E-05	1.06446E-07	0.009972287	0.027713349
1537.0	3.74108E-07	55.50823882	8.58863E-08	1.43144E-09	2.76073E-05	1.06039E-07	0.009972393	0.02760731
1538.0	3.72676E-07	55.50823882	8.55576E-08	1.42596E-09	2.75017E-05	1.05633E-07	0.009972498	0.027501677
1539.0	3.7125E-07	55.50823882	8.52303E-08	1.4205E-09	2.73964E-05	1.05229E-07	0.009972604	0.027396448
1540.0	3.6983E-07	55.50823882	8.49042E-08	1.41507E-09	2.72916E-05	1.04826E-07	0.009972708	0.027291622
1541.0	3.68415E-07	55.50823881	8.45793E-08	1.40965E-09	2.71872E-05	1.04425E-07	0.009972813	0.027187197
1542.0	3.67005E-07	55.50823881	8.42557E-08	1.40426E-09	2.70832E-05	1.04026E-07	0.009972917	0.027083171
1543.0	3.65601E-07	55.50823881	8.39333E-08	1.39889E-09	2.69795E-05	1.03628E-07	0.00997302	0.026979544
1544.0	3.64202E-07	55.50823881	8.36121E-08	1.39354E-09	2.68763E-05	1.03231E-07	0.009973124	0.026876313
1545.0	3.62809E-07	55.50823881	8.32922E-08	1.3882E-09	2.67735E-05	1.02836E-07	0.009973227	0.026773477
1546.0	3.6142E-07	55.50823881	8.29735E-08	1.38289E-09	2.6671E-05	1.02443E-07	0.009973329	0.026671034
1547.0	3.60037E-07	55.50823881	8.2656E-08	1.3776E-09	2.6569E-05	1.02051E-07	0.009973431	0.026568983
1548.0	3.5866E-07	55.5082388	8.23398E-08	1.37233E-09	2.64673E-05	1.0166E-07	0.009973533	0.026467323
1549.0	3.57288E-07	55.5082388	8.20247E-08	1.36708E-09	2.63661E-05	1.01271E-07	0.009973634	0.026366052
1550.0	3.5592E-07	55.5082388	8.17109E-08	1.36185E-09	2.62652E-05	1.00884E-07	0.009973735	0.026265169
1551.0	3.54559E-07	55.5082388	8.13982E-08	1.35664E-09	2.61647E-05	1.00498E-07	0.009973835	0.026164671
1552.0	3.53202E-07	55.5082388	8.10868E-08	1.35145E-09	2.60646E-05	1.00113E-07	0.009973935	0.026064558
1553.0	3.51851E-07	55.5082388	8.07765E-08	1.34628E-09	2.59648E-05	9.973E-08	0.009974035	0.025964828
1554.0	3.50504E-07	55.5082388	8.04674E-08	1.34112E-09	2.58655E-05	9.93485E-08	0.009974135	0.025865479
1555.0	3.49163E-07	55.5082388	8.01595E-08	1.33599E-09	2.57665E-05	9.89683E-08	0.009974233	0.025766511

1556.0	3.47827E-07	55.50823879	7.98528E-08	1.33088E-09	2.56679E-05	9.85896E-08	0.009974332	0.025667921	
1557.0	3.46496E-07	55.50823879	7.95473E-08	1.32579E-09	2.55697E-05	9.82124E-08	0.00997443	0.025569709	
1558.0	3.4517E-07	55.50823879	7.92429E-08	1.32072E-09	2.54719E-05	9.78366E-08	0.009974528	0.025471872	
1559.0	3.4385E-07	55.50823879	7.89397E-08	1.31566E-09	2.53744E-05	9.74623E-08	0.009974626	0.02537441	
1560.0	3.42534E-07	55.50823879	7.86377E-08	1.31063E-09	2.52773E-05	9.70894E-08	0.009974723	0.025277321	
1561.0	3.41223E-07	55.50823879	7.83368E-08	1.30561E-09	2.51806E-05	9.67179E-08	0.009974819	0.025180603	
1562.0	3.39918E-07	55.50823879	7.80371E-08	1.30062E-09	2.50843E-05	9.63478E-08	0.009974916	0.025084255	
1563.0	3.38617E-07	55.50823878	7.77385E-08	1.29564E-09	2.49883E-05	9.59791E-08	0.009975012	0.024988276	
1564.0	3.37322E-07	55.50823878	7.7441E-08	1.29068E-09	2.48927E-05	9.56119E-08	0.009975107	0.024892664	
1565.0	3.36031E-07	55.50823878	7.71447E-08	1.28575E-09	2.47974E-05	9.52461E-08	0.009975203	0.024797418	
1566.0	3.34745E-07	55.50823878	7.68495E-08	1.28083E-09	2.47025E-05	9.48816E-08	0.009975297	0.024702536	
1567.0	3.33464E-07	55.50823878	7.65555E-08	1.27592E-09	2.4608E-05	9.45186E-08	0.009975392	0.024608018	
1568.0	3.32188E-07	55.50823878	7.62626E-08	1.27104E-09	2.45139E-05	9.41569E-08	0.009975486	0.024513861	
1569.0	3.30917E-07	55.50823878	7.59708E-08	1.26618E-09	2.44201E-05	9.37967E-08	0.00997558	0.024420064	
1570.0	3.29651E-07	55.50823878	7.56801E-08	1.26133E-09	2.43266E-05	9.34378E-08	0.009975673	0.024326626	
1571.0	3.2839E-07	55.50823877	7.53905E-08	1.25651E-09	2.42335E-05	9.30802E-08	0.009975766	0.024233546	
1572.0	3.27133E-07	55.50823877	7.5102E-08	1.2517E-09	2.41408E-05	9.27241E-08	0.009975859	0.024140822	
1573.0	3.25882E-07	55.50823877	7.48147E-08	1.24691E-09	2.40485E-05	9.23693E-08	0.009975952	0.024048453	
1574.0	3.24635E-07	55.50823877	7.45284E-08	1.24214E-09	2.39564E-05	9.20159E-08	0.009976044	0.023956437	
1575.0	3.23393E-07	55.50823877	7.42432E-08	1.23739E-09	2.38648E-05	9.16638E-08	0.009976135	0.023864773	
1576.0	3.22155E-07	55.50823877	7.39592E-08	1.23265E-09	2.37735E-05	9.13131E-08	0.009976227	0.02377346	
1577.0	3.20923E-07	55.50823877	7.36762E-08	1.22794E-09	2.36825E-05	9.09637E-08	0.009976318	0.023682496	
1578.0	3.19695E-07	55.50823877	7.33943E-08	1.22324E-09	2.35919E-05	9.06156E-08	0.009976408	0.023591881	
1579.0	3.18471E-07	55.50823876	7.31135E-08	1.21856E-09	2.35016E-05	9.02689E-08	0.009976498	0.023501612	
1580.0	3.17253E-07	55.50823876	7.28337E-08	1.21389E-09	2.34117E-05	8.99235E-08	0.009976588	0.023411688	
1581.0	3.16039E-07	55.50823876	7.2555E-08	1.20925E-09	2.33221E-05	8.95794E-08	0.009976678	0.023322109	
1582.0	3.1483E-07	55.50823876	7.22774E-08	1.20462E-09	2.32329E-05	8.92367E-08	0.009976767	0.023232872	
1583.0	3.13625E-07	55.50823876	7.20008E-08	1.20001E-09	2.3144E-05	8.88952E-08	0.009976856	0.023143977	
1584.0	3.12425E-07	55.50823876	7.17254E-08	1.19542E-09	2.30554E-05	8.85551E-08	0.009976945	0.023055422	
1585.0	3.1123E-07	55.50823876	7.14509E-08	1.19085E-09	2.29672E-05	8.82163E-08	0.009977033	0.022967206	
1586.0	3.10039E-07	55.50823876	7.11775E-08	1.18629E-09	2.28793E-05	8.78787E-08	0.009977121	0.022879327	
1587.0	3.08852E-07	55.50823876	7.09052E-08	1.18175E-09	2.27918E-05	8.75425E-08	0.009977208	0.022791784	
1588.0	3.07671E-07	55.50823875	7.06339E-08	1.17723E-09	2.27046E-05	8.72075E-08	0.009977295	0.022704577	
1589.0	3.06493E-07	55.50823875	7.03636E-08	1.17273E-09	2.26177E-05	8.68738E-08	0.009977382	0.022617703	
1590.0	3.05321E-07	55.50823875	7.00944E-08	1.16824E-09	2.25312E-05	8.65414E-08	0.009977469	0.022531161	
1591.0	3.04153E-07	55.50823875	6.98262E-08	1.16377E-09	2.2445E-05	8.62103E-08	0.009977555	0.022444951	
1592.0	3.02989E-07	55.50823875	6.9559E-08	1.15932E-09	2.23591E-05	8.58805E-08	0.009977641	0.022359071	
1593.0	3.01829E-07	55.50823875	6.92929E-08	1.15488E-09	2.22735E-05	8.55518E-08	0.009977726	0.022273519	
1594.0	3.00675E-07	55.50823875	6.90277E-08	1.15046E-09	2.21883E-05	8.52245E-08	0.009977812	0.022188294	
1595.0	2.99524E-07	55.50823875	6.87636E-08	1.14606E-09	2.21034E-05	8.48984E-08	0.009977897	0.022103396	
1596.0	2.98378E-07	55.50823874	6.85005E-08	1.14167E-09	2.20188E-05	8.45736E-08	0.009977981	0.022018822	
1597.0	2.97236E-07	55.50823874	6.82384E-08	1.13731E-09	2.19346E-05	8.425E-08	0.009978065	0.021934572	
1598.0	2.96099E-07	55.50823874	6.79773E-08	1.13295E-09	2.18506E-05	8.39276E-08	0.009978149	0.021850645	
1599.0	2.94966E-07	55.50823874	6.77172E-08	1.12862E-09	2.1767E-05	8.36065E-08	0.009978233	0.021767038	
1600.0	2.93837E-07	55.50823874	6.74581E-08	1.1243E-09	2.16838E-05	8.32866E-08	0.009978316	0.021683752	
1601.0	2.92713E-07	55.50823874	6.72E-08	1.12E-09	2.16008E-05	8.29679E-08	0.009978399	0.021600784	
1602.0	2.91593E-07	55.50823874	6.69429E-08	1.11571E-09	2.15181E-05	8.26504E-08	0.009978482	0.021518133	
1603.0	2.90477E-07	55.50823874	6.66867E-08	1.11145E-09	2.14358E-05	8.23342E-08	0.009978564	0.021435799	

1604.0	2.89366E-07	55.50823874	6.64316E-08	1.10719E-09	2.13538E-05	8.20192E-08	0.009978646	0.02135378
1605.0	2.88259E-07	55.50823873	6.61774E-08	1.10296E-09	2.12721E-05	8.17053E-08	0.009978728	0.021272075
1606.0	2.87156E-07	55.50823873	6.59242E-08	1.09874E-09	2.11907E-05	8.13927E-08	0.009978809	0.021190682
1607.0	2.86057E-07	55.50823873	6.56719E-08	1.09453E-09	2.11096E-05	8.10813E-08	0.00997889	0.021109601
1608.0	2.84963E-07	55.50823873	6.54206E-08	1.09034E-09	2.10288E-05	8.0771E-08	0.009978971	0.02102883
1609.0	2.83872E-07	55.50823873	6.51703E-08	1.08617E-09	2.09484E-05	8.0462E-08	0.009979052	0.020948368
1610.0	2.82786E-07	55.50823873	6.4921E-08	1.08202E-09	2.08682E-05	8.01541E-08	0.009979132	0.020868214
1611.0	2.81704E-07	55.50823873	6.46726E-08	1.07788E-09	2.07884E-05	7.98474E-08	0.009979212	0.020788366
1612.0	2.80626E-07	55.50823873	6.44251E-08	1.07375E-09	2.07088E-05	7.95419E-08	0.009979291	0.020708824
1613.0	2.79552E-07	55.50823873	6.41786E-08	1.06964E-09	2.06296E-05	7.92376E-08	0.00997937	0.020629587
1614.0	2.78483E-07	55.50823872	6.3933E-08	1.06555E-09	2.05507E-05	7.89344E-08	0.009979449	0.020550652
1615.0	2.77417E-07	55.50823872	6.36884E-08	1.06147E-09	2.0472E-05	7.86324E-08	0.009979528	0.02047202
1616.0	2.76356E-07	55.50823872	6.34447E-08	1.05741E-09	2.03937E-05	7.83315E-08	0.009979606	0.020393688
1617.0	2.75298E-07	55.50823872	6.3202E-08	1.05337E-09	2.03157E-05	7.80318E-08	0.009979684	0.020315657
1618.0	2.74245E-07	55.50823872	6.29601E-08	1.04934E-09	2.02379E-05	7.77332E-08	0.009979762	0.020237924
1619.0	2.73196E-07	55.50823872	6.27192E-08	1.04532E-09	2.01605E-05	7.74358E-08	0.00997984	0.020160488
1620.0	2.7215E-07	55.50823872	6.24792E-08	1.04132E-09	2.00833E-05	7.71395E-08	0.009979917	0.020083348
1621.0	2.71109E-07	55.50823872	6.22402E-08	1.03734E-09	2.00065E-05	7.68443E-08	0.009979993	0.020006504
1622.0	2.70072E-07	55.50823872	6.2002E-08	1.03337E-09	1.993E-05	7.65503E-08	0.00998007	0.019929954
1623.0	2.69038E-07	55.50823872	6.17648E-08	1.02941E-09	1.98537E-05	7.62574E-08	0.009980146	0.019853696
1624.0	2.68009E-07	55.50823871	6.15285E-08	1.02547E-09	1.97777E-05	7.59656E-08	0.009980222	0.019777731
1625.0	2.66983E-07	55.50823871	6.1293E-08	1.02155E-09	1.97021E-05	7.56749E-08	0.009980298	0.019702056
1626.0	2.65962E-07	55.50823871	6.10585E-08	1.01764E-09	1.96267E-05	7.53854E-08	0.009980373	0.01962667
1627.0	2.64944E-07	55.50823871	6.08249E-08	1.01375E-09	1.95516E-05	7.50969E-08	0.009980448	0.019551573
1628.0	2.6393E-07	55.50823871	6.05922E-08	1.00987E-09	1.94768E-05	7.48096E-08	0.009980523	0.019476764
1629.0	2.62921E-07	55.50823871	6.03603E-08	1.00601E-09	1.94022E-05	7.45234E-08	0.009980598	0.01940224
1630.0	2.61915E-07	55.50823871	6.01294E-08	1.00216E-09	1.9328E-05	7.42382E-08	0.009980672	0.019328002
1631.0	2.60912E-07	55.50823871	5.98993E-08	9.98322E-10	1.9254E-05	7.39542E-08	0.009980746	0.019254048
1632.0	2.59914E-07	55.50823871	5.96701E-08	9.94502E-10	1.91804E-05	7.36712E-08	0.00998082	0.019180377
1633.0	2.5892E-07	55.50823871	5.94418E-08	9.90696E-10	1.9107E-05	7.33893E-08	0.009980893	0.019106988
1634.0	2.57929E-07	55.5082387	5.92143E-08	9.86906E-10	1.90339E-05	7.31085E-08	0.009980966	0.019033879
1635.0	2.56942E-07	55.5082387	5.89878E-08	9.8313E-10	1.89611E-05	7.28288E-08	0.009981039	0.01896105
1636.0	2.55959E-07	55.5082387	5.87621E-08	9.79368E-10	1.88885E-05	7.25501E-08	0.009981111	0.0188885
1637.0	2.5498E-07	55.5082387	5.85372E-08	9.75621E-10	1.88162E-05	7.22725E-08	0.009981184	0.018816228
1638.0	2.54004E-07	55.5082387	5.83133E-08	9.71888E-10	1.87442E-05	7.1996E-08	0.009981256	0.018744232
1639.0	2.53032E-07	55.5082387	5.80901E-08	9.68169E-10	1.86725E-05	7.17205E-08	0.009981327	0.018672511
1640.0	2.52064E-07	55.5082387	5.78679E-08	9.64464E-10	1.86011E-05	7.14461E-08	0.009981399	0.018601065
1641.0	2.51099E-07	55.5082387	5.76464E-08	9.60774E-10	1.85299E-05	7.11727E-08	0.00998147	0.018529892
1642.0	2.50139E-07	55.5082387	5.74259E-08	9.57098E-10	1.8459E-05	7.09004E-08	0.009981541	0.018458992
1643.0	2.49182E-07	55.5082387	5.72061E-08	9.53436E-10	1.83884E-05	7.06291E-08	0.009981612	0.018388363
1644.0	2.48228E-07	55.50823869	5.69873E-08	9.49788E-10	1.8318E-05	7.03588E-08	0.009981682	0.018318004
1645.0	2.47278E-07	55.50823869	5.67692E-08	9.46154E-10	1.82479E-05	7.00896E-08	0.009981752	0.018247914
1646.0	2.46332E-07	55.50823869	5.6552E-08	9.42533E-10	1.81781E-05	6.98215E-08	0.009981822	0.018178093
1647.0	2.4539E-07	55.50823869	5.63356E-08	9.38927E-10	1.81085E-05	6.95543E-08	0.009981891	0.018108539
1648.0	2.44451E-07	55.50823869	5.61201E-08	9.35334E-10	1.80393E-05	6.92882E-08	0.009981961	0.018039251
1649.0	2.43515E-07	55.50823869	5.59053E-08	9.31755E-10	1.79702E-05	6.9023E-08	0.00998203	0.017970227
1650.0	2.42584E-07	55.50823869	5.56914E-08	9.2819E-10	1.79015E-05	6.87589E-08	0.009982099	0.017901469
1651.0	2.41655E-07	55.50823869	5.54783E-08	9.24639E-10	1.7833E-05	6.84959E-08	0.009982167	0.017832973

1652.0	2.40731E-07	55.50823869	5.52661E-08	9.21101E-10	1.77647E-05	6.82338E-08	0.009982235	0.017764739	
1653.0	2.3981E-07	55.50823869	5.50546E-08	9.17577E-10	1.76968E-05	6.79727E-08	0.009982303	0.017696766	
1654.0	2.38892E-07	55.50823869	5.48439E-08	9.14066E-10	1.76291E-05	6.77126E-08	0.009982371	0.017629054	
1655.0	2.37978E-07	55.50823868	5.46341E-08	9.10568E-10	1.75616E-05	6.74535E-08	0.009982438	0.0175616	
1656.0	2.37067E-07	55.50823868	5.4425E-08	9.07084E-10	1.74944E-05	6.71954E-08	0.009982506	0.017494405	
1657.0	2.3616E-07	55.50823868	5.42168E-08	9.03613E-10	1.74275E-05	6.69383E-08	0.009982573	0.017427466	
1658.0	2.35257E-07	55.50823868	5.40094E-08	9.00156E-10	1.73608E-05	6.66822E-08	0.009982639	0.017360784	
1659.0	2.34357E-07	55.50823868	5.38027E-08	8.96712E-10	1.72944E-05	6.64271E-08	0.009982706	0.017294357	
1660.0	2.3346E-07	55.50823868	5.35968E-08	8.93281E-10	1.72282E-05	6.61729E-08	0.009982772	0.017228184	
1661.0	2.32567E-07	55.50823868	5.33918E-08	8.89863E-10	1.71623E-05	6.59197E-08	0.009982838	0.017162265	
1662.0	2.31677E-07	55.50823868	5.31875E-08	8.86458E-10	1.70966E-05	6.56675E-08	0.009982903	0.017096597	
1663.0	2.3079E-07	55.50823868	5.2984E-08	8.83066E-10	1.70312E-05	6.54162E-08	0.009982969	0.017031181	
1664.0	2.29907E-07	55.50823868	5.27812E-08	8.79687E-10	1.6966E-05	6.51659E-08	0.009983034	0.016966015	
1665.0	2.29028E-07	55.50823868	5.25793E-08	8.76321E-10	1.69011E-05	6.49166E-08	0.009983099	0.016901098	
1666.0	2.28151E-07	55.50823867	5.23781E-08	8.72968E-10	1.68364E-05	6.46682E-08	0.009983164	0.01683643	
1667.0	2.27278E-07	55.50823867	5.21777E-08	8.69628E-10	1.6772E-05	6.44207E-08	0.009983228	0.016772009	
1668.0	2.26409E-07	55.50823867	5.1978E-08	8.66301E-10	1.67078E-05	6.41742E-08	0.009983292	0.016707835	
1669.0	2.25542E-07	55.50823867	5.17791E-08	8.62986E-10	1.66439E-05	6.39287E-08	0.009983356	0.016643907	
1670.0	2.24679E-07	55.50823867	5.1581E-08	8.59684E-10	1.65802E-05	6.36841E-08	0.00998342	0.016580222	
1671.0	2.2382E-07	55.50823867	5.13837E-08	8.56394E-10	1.65168E-05	6.34404E-08	0.009983483	0.016516782	
1672.0	2.22963E-07	55.50823867	5.11871E-08	8.53118E-10	1.64536E-05	6.31977E-08	0.009983546	0.016453584	
1673.0	2.2211E-07	55.50823867	5.09912E-08	8.49853E-10	1.63906E-05	6.29559E-08	0.009983609	0.016390629	
1674.0	2.2126E-07	55.50823867	5.07961E-08	8.46602E-10	1.63279E-05	6.2715E-08	0.009983672	0.016327914	
1675.0	2.20414E-07	55.50823867	5.06017E-08	8.43362E-10	1.62654E-05	6.2475E-08	0.009983735	0.016265439	
1676.0	2.1957E-07	55.50823867	5.04081E-08	8.40135E-10	1.62032E-05	6.2236E-08	0.009983797	0.016203203	
1677.0	2.1873E-07	55.50823866	5.02152E-08	8.36921E-10	1.61412E-05	6.19978E-08	0.009983859	0.016141205	
1678.0	2.17893E-07	55.50823866	5.00231E-08	8.33718E-10	1.60794E-05	6.17606E-08	0.009983921	0.016079444	
1679.0	2.1706E-07	55.50823866	4.98317E-08	8.30528E-10	1.60179E-05	6.15243E-08	0.009983982	0.01601792	
1680.0	2.16229E-07	55.50823866	4.9641E-08	8.27351E-10	1.59566E-05	6.12889E-08	0.009984043	0.015956631	
1681.0	2.15402E-07	55.50823866	4.94511E-08	8.24185E-10	1.58956E-05	6.10544E-08	0.009984104	0.015895577	
1682.0	2.14577E-07	55.50823866	4.92619E-08	8.21031E-10	1.58348E-05	6.08208E-08	0.009984165	0.015834756	
1683.0	2.13756E-07	55.50823866	4.90734E-08	8.1789E-10	1.57742E-05	6.05881E-08	0.009984226	0.015774168	
1684.0	2.12939E-07	55.50823866	4.88856E-08	8.1476E-10	1.57138E-05	6.03562E-08	0.009984286	0.015713811	
1685.0	2.12124E-07	55.50823866	4.86986E-08	8.11643E-10	1.56537E-05	6.01253E-08	0.009984346	0.015653686	
1686.0	2.11312E-07	55.50823866	4.85122E-08	8.08537E-10	1.55938E-05	5.98952E-08	0.009984406	0.015593791	
1687.0	2.10504E-07	55.50823866	4.83266E-08	8.05444E-10	1.55341E-05	5.96661E-08	0.009984466	0.015534125	
1688.0	2.09698E-07	55.50823866	4.81417E-08	8.02362E-10	1.54747E-05	5.94378E-08	0.009984525	0.015474687	
1689.0	2.08896E-07	55.50823866	4.79575E-08	7.99292E-10	1.54155E-05	5.92103E-08	0.009984585	0.015415477	
1690.0	2.08097E-07	55.50823865	4.7774E-08	7.96233E-10	1.53565E-05	5.89838E-08	0.009984644	0.015356493	
1691.0	2.073E-07	55.50823865	4.75912E-08	7.93187E-10	1.52977E-05	5.87581E-08	0.009984702	0.015297735	
1692.0	2.06507E-07	55.50823865	4.74091E-08	7.90152E-10	1.52392E-05	5.85333E-08	0.009984761	0.015239202	
1693.0	2.05717E-07	55.50823865	4.72277E-08	7.87129E-10	1.51809E-05	5.83093E-08	0.009984819	0.015180892	
1694.0	2.0493E-07	55.50823865	4.7047E-08	7.84117E-10	1.51228E-05	5.80862E-08	0.009984877	0.015122806	
1695.0	2.04146E-07	55.50823865	4.6867E-08	7.81117E-10	1.50649E-05	5.78639E-08	0.009984935	0.015064942	
1696.0	2.03365E-07	55.50823865	4.66877E-08	7.78128E-10	1.50073E-05	5.76425E-08	0.009984993	0.0150073	
1697.0	2.02586E-07	55.50823865	4.6509E-08	7.7515E-10	1.49499E-05	5.7422E-08	0.00998505	0.014949878	
1698.0	2.01811E-07	55.50823865	4.63311E-08	7.72185E-10	1.48927E-05	5.72023E-08	0.009985107	0.014892675	
1699.0	2.01039E-07	55.50823865	4.61538E-08	7.6923E-10	1.48357E-05	5.69834E-08	0.009985164	0.014835692	

1700.0	2.0027E-07	55.50823865	4.59772E-08	7.66287E-10	1.47789E-05	5.67654E-08	0.009985221	0.014778927
1701.0	1.99504E-07	55.50823865	4.58013E-08	7.63355E-10	1.47224E-05	5.65482E-08	0.009985278	0.014722378
1702.0	1.9874E-07	55.50823864	4.5626E-08	7.60434E-10	1.4666E-05	5.63318E-08	0.009985334	0.014666047
1703.0	1.9798E-07	55.50823864	4.54515E-08	7.57524E-10	1.46099E-05	5.61163E-08	0.00998539	0.01460993
1704.0	1.97222E-07	55.50823864	4.52775E-08	7.54626E-10	1.4554E-05	5.59015E-08	0.009985446	0.014554029
1705.0	1.96468E-07	55.50823864	4.51043E-08	7.51738E-10	1.44983E-05	5.56876E-08	0.009985502	0.014498341
1706.0	1.95716E-07	55.50823864	4.49317E-08	7.48862E-10	1.44429E-05	5.54746E-08	0.009985557	0.014442867
1707.0	1.94967E-07	55.50823864	4.47598E-08	7.45997E-10	1.43876E-05	5.52623E-08	0.009985612	0.014387604
1708.0	1.94221E-07	55.50823864	4.45885E-08	7.43142E-10	1.43326E-05	5.50509E-08	0.009985667	0.014332553
1709.0	1.93478E-07	55.50823864	4.44179E-08	7.40299E-10	1.42777E-05	5.48402E-08	0.009985722	0.014277713
1710.0	1.92738E-07	55.50823864	4.4248E-08	7.37466E-10	1.42231E-05	5.46304E-08	0.009985777	0.014223083
1711.0	1.92E-07	55.50823864	4.40787E-08	7.34644E-10	1.41687E-05	5.44214E-08	0.009985831	0.014168662
1712.0	1.91266E-07	55.50823864	4.391E-08	7.31834E-10	1.41144E-05	5.42131E-08	0.009985886	0.014114448
1713.0	1.90534E-07	55.50823864	4.3742E-08	7.29033E-10	1.40604E-05	5.40057E-08	0.00998594	0.014060443
1714.0	1.89805E-07	55.50823864	4.35746E-08	7.26244E-10	1.40066E-05	5.37991E-08	0.009985993	0.014006644
1715.0	1.89078E-07	55.50823864	4.34079E-08	7.23465E-10	1.39531E-05	5.35932E-08	0.009986047	0.01395305
1716.0	1.88355E-07	55.50823863	4.32418E-08	7.20697E-10	1.38997E-05	5.33881E-08	0.0099861	0.013899662
1717.0	1.87634E-07	55.50823863	4.30764E-08	7.17939E-10	1.38465E-05	5.31839E-08	0.009986154	0.013846478
1718.0	1.86916E-07	55.50823863	4.29115E-08	7.15192E-10	1.37935E-05	5.29804E-08	0.009986207	0.013793498
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1724.0	1.82666E-07	55.50823863	4.19358E-08	6.98929E-10	1.34798E-05	5.17756E-08	0.00998652	0.013479846
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1739.0	1.72458E-07	55.50823862	3.95923E-08	6.59872E-10	1.27266E-05	4.88823E-08	0.009987273	0.012726565
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1746.0	1.67892E-07	55.50823861	3.8544E-08	6.42399E-10	1.23896E-05	4.7588E-08	0.00998761	0.012389586
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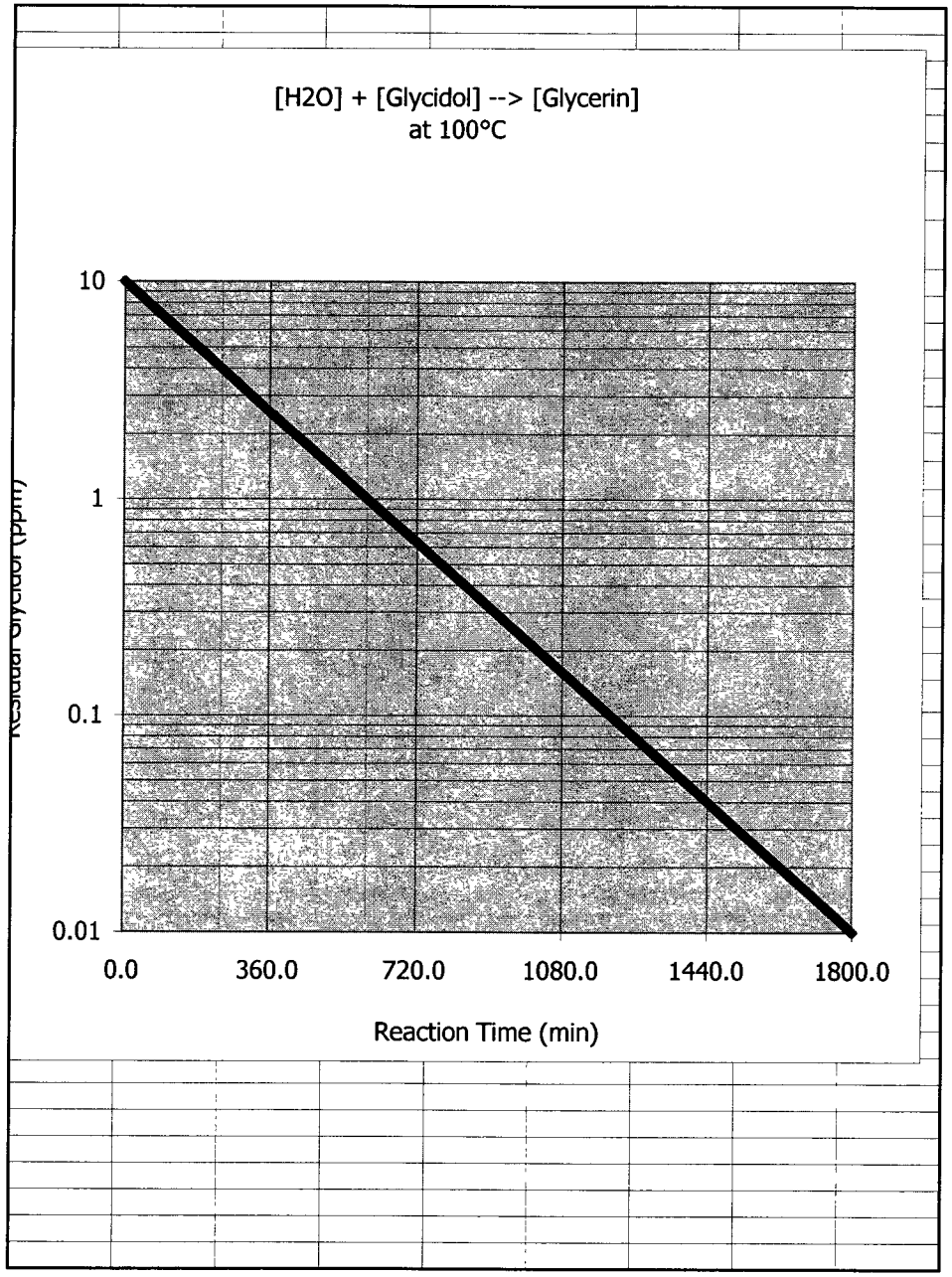
1800.0	1.36497E-07	55.50823858	3.13365E-08	5.22276E-10	1.00728E-05	3.86894E-08	0.009989927	0.010072827	


[H2O] + [Glycidol] --> [Glycerin]
at 100°C
10
1
0.1
0.01
0.0
360.0
720.0
1080.0
1440.0
1800.0
Reaction Time (min)

AM

From: Foley, John
To: Mosley, Sylvester;
cc: Drozen, Melvin S.;
Scheuplein, Robert J.;
Subject: Questions re GRN 269
Date: Thursday, May 07, 2009 4:42:16 PM

Dear Dr. Mosley

This email responds to your April 10, 2009 email, which requested clarification in two areas regarding GRN 269. Your questions are repeated below, followed by Taiyo-Kagaku Co., Ltd.'s, response.

Question (1)

On page 6 of the notification it is mentioned that Taiyo-Kagaku has determined that PGFAs produced from its PGs and edible fatty acids or fatty acid containing edible oils identified in 21 C.F.R. 172.854 for use as emulsifiers..... Which fatty acid containing edible oils are used and why is it not discussed in the method of manufacture?

After consulting with Taiyo-Kagaku, we wish to amend GRN 269 to clarify the use of fatty acids and edible oils in the production of the company's polyglycerol esters of fatty acids (PGFAs). Taiyo-Kagaku's PGFAs are only made by the reaction of PGs and certain specific food grade fatty acids; contrary to the statement on page 6 of the GRN, the PGFAs are not made from edible oils. GRN 269 states on page 7, Section B. Method of Manufacture, that the PGFAs are made by reacting PGs with stearic acid, palmitic acid, oleic acid or coconut fatty acid. These fatty acids (except palmitic acid) encompass those that will be used for PGFAs intended for use as cloud inhibitors in vegetable oils and salad oils in accordance with Section 172.854(c). However, for PGFAs intended for use as emulsifiers, Taiyo-Kagaku may use any of the fatty acids identified in and complying with Sections 172.860(a) or 172.862. These fatty acids, which include capric acid, caprylic acid, lauric acid, myristic acid, oleic acid, palmitic acid and stearic acid, will be derived from edible oil and will be food grade.

Question (2)

On page 7, the notification mentions the use of coconut fatty acid as one of the fatty acids. What is the make-up of this fatty acid? For example, when stearic acid is used, we know that you are referring to a C-18 saturated fatty acid.

The coconut fatty acids that may be used are derived from food-grade coconut

oil (unhydrogenated), i.e., coconut oil that complies with the current Food Chemicals Codex monograph for the oil. The coconut fatty acid is a mixture of fatty acids with a fatty acid profile similar to that of FCC-compliant coconut oil. Consistent with the fatty acid profile in the FCC monograph for coconut oil (unhydrogenated), the coconut fatty acids that may be reacted with Taiyo's PGs consist primarily of the triglycerides of the fatty acids: 12:0, 14:0, 16:0 and lower amounts of others.

We trust that you will consider the above and attached information responsive to your questions. If you require further information on this or other topics regarding GRN 269, please let us know by phone or email.

Sincerely,

Melvin S. Drozen
John Foley

John F. Foley
tel: 202.434.4186 | fax 202.434.4646 | foleyj@khlaw.com
1001 G Street, N.W., Suite 500 West | Washington, D.C. 20001

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AM

From: Foley, John
To: Mosley, Sylvester;
cc: Drozen, Melvin S.;
Scheuplein, Robert J.;
Subject: RE: Questions re GRN 269
Date: Wednesday, May 13, 2009 1:58:19 PM

Dear Dr. Mosley

The purpose of this email is to confirm the substance of our May 12, 2009 telephone conversation, in which we clarified our May 7, 2009 response to your April 10, 2009 email, which requested clarification regarding the use of fatty acids and edible oils in the production of Taiyo-Kagaku, Inc., Ltd.'s, polyglycerol esters of fatty acids (PGFAs) that are the subject of GRN 269.

Taiyo-Kagaku's PGFAs, which are intended for use as emulsifiers in food or as cloud inhibitors in vegetable oils and salad oils, are made by the reaction of polyglycerols and one of the following food-grade fatty acids, derived from food-grade edible oil: stearic acid, palmitic acid, oleic acid, coconut fatty acid, capric acid, caprylic acid, lauric acid, or myristic acid.

If you require further information on this or other topics regarding GRN 269, please let us know by phone or email.

Sincerely,

Melvin S. Drozen
John Foley
Bob Scheuplein

John F. Foley
tel: 202.434.4186 | fax 202.434.4646 | foleyj@khlaw.com
1001 G Street, N.W., Suite 500 West | Washington, D.C. 20001

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-----Original Message-----
From: Mosley, Sylvester [mailto:Sylvester.Mosley@fda.hhs.gov]
Sent: Tue 5/12/2009 10:38 AM
To: Foley, John
Subject: RE: Questions re GRN 269

Dear Mr. Foley,

I will call you on 202-434-4186 between 11:05-11:10.

Thanks,

Sylvester L. Mosley, Ph.D.
Consumer Safety Officer
Division of Biotechnology and GRAS Notice Review
Office of Food Additive Safety-CFSAN
U.S. Food and Drug Administration
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Fax: 301-436-2965
Email: Sylvester.Mosley@fda.hhs.gov

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From: Foley, John [mailto:Foleyj@khlaw.com]
Sent: Monday, May 11, 2009 10:09 AM
To: Mosley, Sylvester
Cc: Scheuplein, Robert J.
Subject: RE: Questions re GRN 269

Dear Dr. Mosley:

I can talk tomorrow at 11. Bob Scheuplein of our scientific staff, who also worked on our response, will be on the call with me.

John F. Foley
tel: 202.434.4186 | fax 202.434.4646 | foleyj@khlaw.com
1001 G Street, N.W., Suite 500 West | Washington, D.C. 20001

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-----Original Message-----
From: Mosley, Sylvester [mailto:Sylvester.Mosley@fda.hhs.gov]
Sent: Mon 5/11/2009 9:34 AM
To: Foley, John
Subject: RE: Questions re GRN 269

Dear Mr. Foley,

Our chemistry review team and I would like to schedule a teleconference to further clarify your response to our inquiry. The phone call should only take a few minutes. We would like to schedule this as soon as possible. My team can be available tomorrow, May 12, 2009 at 11 a.m.; would this time work for you? If so, then I could call you at that time.

Thanks,

Sylvester L. Mosley, Ph.D.
Consumer Safety Officer
Division of Biotechnology and GRAS Notice Review
Office of Food Additive Safety-CFSAN
U.S. Food and Drug Administration
5100 Paint Branch Parkway (HFS-255)

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From: Foley, John [mailto:Foleyj@khlaw.com]
Sent: Thursday, May 07, 2009 4:42 PM
To: Mosley, Sylvester
Cc: Drozen, Melvin S.; Scheuplein, Robert J.
Subject: Questions re GRN 269

Dear Dr. Mosley

This email responds to your April 10, 2009 email, which requested clarification in two areas regarding GRN 269. Your questions are repeated below, followed by Taiyo-Kagaku Co., Ltd.'s, response.

Question (1)

On page 6 of the notification it is mentioned that Taiyo-Kagaku has determined that PGFAs produced from its PGs and edible fatty acids or fatty acid containing edible oils identified in 21 C.F.R. 172.854 for use as emulsifiers..... Which fatty acid containing edible oils are used and why is it not discussed in the method of manufacture?

After consulting with Taiyo-Kagaku, we wish to amend GRN 269 to clarify the use of fatty acids and edible oils in the production of the company's polyglycerol esters of fatty acids (PGFAs). Taiyo-Kagaku's PGFAs are only made by the reaction of PGs and certain specific food grade fatty acids; contrary to the statement on page 6 of the GRN, the PGFAs are not made from edible oils. GRN 269 states on page 7, Section B. Method of Manufacture, that the PGFAs are made by reacting PGs with

stearic acid, palmitic acid, oleic acid or coconut fatty acid. These fatty acids (except palmitic acid) encompass those that will be used for PGFAs intended for use as cloud inhibitors in vegetable oils and salad oils in accordance with Section 172.854(c). However, for PGFAs intended for use as emulsifiers, Taiyo-Kagaku may use any of the fatty acids identified in and complying with Sections 172.860(a) or 172.862. These fatty acids, which include capric acid, caprylic acid, lauric acid, myristic acid, oleic acid, palmitic acid and stearic acid, will be derived from edible oil and will be food grade.

Question (2)

On page 7, the notification mentions the use of coconut fatty acid as one of the fatty acids. What is the make-up of this fatty acid? For example, when stearic acid is used, we know that you are referring to a C-18 saturated fatty acid.

The coconut fatty acids that may be used are derived from food-grade coconut oil (unhydrogenated), i.e., coconut oil that complies with the current Food Chemicals Codex monograph for the oil. The coconut fatty acid is a mixture of fatty acids with a fatty acid profile similar to that of FCC-compliant coconut oil. Consistent with the fatty acid profile in the FCC monograph for coconut oil (unhydrogenated), the coconut fatty acids that may be reacted with Taiyo's PGs consist primarily of the triglycerides of the fatty acids: 12:0, 14:0, 16:0 and lower amounts of others.

We trust that you will consider the above and attached information responsive to your questions. If you require further information on this or other topics regarding GRN 269, please let us know by phone or email.

Sincerely,

Melvin S. Drozen
John Foley

John F. Foley
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