

Subject Bibliography

Documents to which a number prefixed by the letters FD is attached can be consulted at the Technical Information and Documents Unit, 40 Cadogan Square, S.W.1. Abstracts are available in cases where A appears at the end of the summary of contents; translations in full are available if F appears. Micro-film reels are also available at this address

1. Physics and Chemistry of Oxidation and Flames.

A. Reaction Kinetics of the Slow Oxidation of Hydrocarbons.

	<u>Document No.</u>	<u>Title</u>	<u>Contents</u>
Muffling (1941)	F.D. 2873/46 Item 8 pp. 56-71	"Reaction kinetics in the oxidation of n- and iso-paraffins"	- F.
Dankohler (1941)	" pp. 91-109	"Isentropic change of state in dissociating gases, and the application of the method of sound dispersion to the investigation of very rapid homogeneous gas reactions"	- F.
Dankohler and Sander (1940)	-	Jahrbuch 1940 d. deutschen Luftfahrtfor- schung, 11. 427/48. "Apparatus for the kinetic investigation of very rapid homogeneous gas reactions"	

Fahlbusch
(1942)

Oel u. Kohle p. 887 and 965 (1942)
"Investigation about the oxidation of
aromatics and ketones in the gas phase"

B. Ignition Delay

Blume
(1940)

F.D. 2869/46 Item 19
pp. 43-61

"Mixture formation and combustion in
the bomb. Methods of control of
combustion in injection engines"

The uses of the bomb in
examining mixture formation,
ignition delay, position of
initial combustion relative
to type of spray; wall
effects, etc., are discussed
and examined. - A.

Dreyhaupt
(1941)

F.D. 2873/46 Item 1
pp. 75-89

"On the theory of the process
of combustion in engines"

Combustion in diesel engines,
discusses the behaviour of a
single drop and then applies
the results to jets.

Jost, Rogener
and Weber
(1941)

F.D. 2873/46 Item 8
pp. 2-11

"Recent investigations on the
self-ignition of fuels by
adiabatic compression"

- F.

Schmidt
(1941)

"
pp. 77-89

"The effect of individual factors
on engine detonation"

- F.

- Zeise (1941) F.D. 2873/46 Item 8 pp. 112-127 "Physico-chemical problems in the ignition of gas mixtures in engines. Self ignition and knocking" - F.
- Lonn (1942) - B.I.O.S. Final Report No. 532 "Visit to chemical research establishments working on combustion problems"
- Luftfahrtforschung (1942) p. 344 "Ignition delay measurements on liquid fuels for Otto engines".
- F.A.F. Schmidt (1944) F.I.A.T. Final Report No. 709 "Verbrennungsmotoren". (2nd Edn.)
- U. Stoll. (1942) - Motortechnische Zeitschrift p. 351 (1942) "Physico-chemical problem of self ignition and knock".
- Jost and Teichmann (1939) - Naturwiss. 27, 318. "On the self ignition of hydrocarbon air mixtures by adiabatic compression".
- Weber and Rastetter (1939) - Naturwiss. 27, 164. "The self ignition of hydrocarbons by adiabatic compression".
- C. The Mechanism of Explosive Gas Reactions.
- Muffling (1944) - z.f. Physik 122, 787. "Contribution to the theory of explosive gas reactions".

D. Flames.

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|----------------------------------|--|---|------|
| Unger
(1941) | F.D. 2873/46 Item 8 | "Measuring the rate of ignition of
an air-fuel stream". | - F. |
| Hubner and
Klaukens
(1941) | - | Annal der Physik 5, 39, No. 1
"Calculation of the <u>intensity</u>
distribution on image of a flame
cone". | |
| Hubner and
Klaukens
(1941) | - | Jahrbuch Luftfahrtforschung (1941)
11. 18-22.
"Ratio of the apparent width of the
luminous zone of a flame cone to the
intensity distribution normal to the
cone". | |
| Geib
(1941) | - | z.f. Elektrochemie 47, 275
"Spectroscopic <u>investigations</u> on flames
with atomic oxygen". | |
| Hubner and
Wolfhard | R.A.E. Library
Translation
No. 125 | "Combustion at high altitudes" | |
| Zeise
(1943) | | Motortechnische Zeitschrift p. 378 (1943)
"Recent spectroscopic investigations into
engine combustion I" | |

B.I.O.S. Final
Report No. 532

"Visit to chemical research
establishments working on
combustion problems".

Microfilm Reel
No. LF 106
T.O.M. Reel
No. 172

Contains letters from
Dr. Behrens to Dr. v. Elbe
summarising work. Also
contains papers by Dr.
Behrens.

2. Combustion in Spark Ignition Engines.

A. Cause of Knock.

Widmaier
(1942)

F.D. 2872/46 Item 49

"The effect of peroxide in engines
and its determination"

Starting with the thiocyanate
method of Joule, and Wilson
some improvements on it are
made - F.

Widmaier
(1943)

F.D. 2872/46 Item 50

"The effect of aldehyde on engines
and its quantitative determination"

Review and test of various known
methods. Best results were
obtained with Hydroxylamine
hydrochloride - F.

Kuhn and
Zimmer
(1941)

F.D. 2873/46 Item 6
pp. 448-453

"Damage caused by detonation, its
causes and prevention"

Experiments to find out the
conditions for and location
of knock damage.

- Schmidt and Muhlner (1941) F.D. 2873/46 Item 8 p2. 28-56 - F.
 "Pre-ignition reactions in the gasoline engine"
- Dreyhaupt (1941) -
 Automobiltechnische Zeitschrift p. 587 (1941)
 "Some special questions on knock in Otto engines"
- E. Schmidt (1944) -
 V.D.I. 88, p. 75
 "Conference for heat research of V.D.I. 25th October, 1943."
- Roegner
 Microfilm Reel
 No. LF 105
 T.O.M. Reel No. 172
 B. Prevention of Knock.
 Phenomena Occurring with High Valve Overlap
- Thiel (1942) F.D. 2867/46 Item 42
 "The knocking of fuels in gasoline engines and its prevention"
 Introductory course for mineral oil chemists in the Luftwaffe.
- Widmaier and Nemminger (1942) F.D. 2873/46 Item 19
 "Development and importance of T.E.L. as an anti-knock addition"
 Critical review of literature on T.E.L., its properties, production, use and effect as well as its detection.

- Franké
(1942)
- F.D. 2876/46 Item 82
- "The effect of different fuels and of valve overlap on engines"
- Tests in the B.M.W. 132N and D.B.601 A with fuels differing in calorific value, C/H ratio and specific gravity, measuring output consumption and air turnover. Same fuels with varying valve overlap - F.
- Franké
(1942)
- F.D. 2876/46 Item 83
- "Effect of valve overlap of the knock limit of various fuels in the D.B. 601 engine"
- Franké
(1944)
- F.D. 2876/46 Item 89
- "Difference in the knock behaviour of fuels of different chemical constitution in the B.M.W. 132 N and the D.B. 601E engines"
- The effect of the formation of peroxides in the intake stroke depending on the valve overlap - F.
- Dreyhaupt
(1941)
- Automobiltechnische Zeitschrift p. 587 (1941)
- "Some special questions on knock in Otto engines"
- C. Knock Determination.
- Singer
(1941)
- F.D. 2866/46 Item 3
- "Knock behaviour and anti-knock value determinations of engine fuels"
- Distinction between C.N. and the blending value of a fuel. Determination of the latter-A.

Schuch (1941)	F.D. 2866/46 Item 6	"The determination of knock intensity"	Two methods of measuring knock intensity with a piezo-electric crystal - A. F.
Singer (1941)	F.D. 2866/46 Item 8	"Revised test method for aviation fuels"	Small changes in the Oppau method enable values comparable to those of the D.V.L. supercharge method to be obtained - A. F.
Witschakowski (1941)	F.D. 2866/46 Item 10	"Examination of one aromatic and one paraffinic blend with respect to temperature, lead and mixture sensitivity in the supercharged single cylinder engine"	- A.
Singer (1941)	F.D. 2866/46 Item 13	"Reference fuels and accuracy of O.M. determination."	Advantages of the single reference fuel Z. - A.
Witschakowski (1941)	F.D. 2866/46 Item 19	"A contribution to the knock tests of aviation fuels in small engines"	Description of tests with the I.G. test Diesel used as a supercharge engine. Mixture response curves compared with those of the B.M.W. 132 single cylinder. - A. F.
Singer (1942)	F.D. 2866/46 Item 28	"The evaluation of data for O.M. determinations made by the Oppau method"	Practical details of the Oppau method of fuel rating and the associated experimental error. - A.

Singer (1942)	F.D. 2866/46 Item 29	"Results of correlation tests made with the Oppau and D.V.L. methods." - A.	
Singer (1943)	F.D. 2866/46 Item 30	"Results of correlation tests made with the Oppau method".	Six test stations tested, two commercial aviation fuels and one reference fuel. - A.
Schuch (1942)	F.D. 2866/46 Item 37	"An electrical instrument for the acoustic or optical determining of the starting of knock".	Development of an earlier arrangement. Eliminates basic noise. Works with automatic adjustment. Some comparison curves are given. - A. F.
Singer (1942)	F.D. 2866/46 Item 40	"Comparative knock tests using the secondary reference fuels benzene and Z".	Deals with the effect of the kind of reference fuel on the reproducibility in the same engine, the magnitude of variations for different engines and the agreement for I.G. and C.F.R. engines. - A.
Singer and Dannefelser (1943)	F.D. 2866/46 Item 81	1. Half yearly comparative tests on knock. 2. Determination of Reid Vapour Pressure.	First co-op V.P. determinations on a large scale. Mean variation of ± 0.05 atms. - A.

Singer
(1941)

F.D. 2866/46 Item 92

"The Oppau method of determining octane number"

Application of the Oppau method to aviation gasolines to be tested in the I.G. engine.
- A. F.

Singer
(1941)

F.D. 2867/46 Item 24

"The effect of ethylene dibromide on the O.N."

The motor method O.N. with and without addition of V.T. 708, C.V2.B. and U.T.702 were measured. - A.

Witschalski
(1942)

F.D. 2867/46 Item 27

"Small supercharged engines developed in relation to the D.V.L. supercharge method with the B.M.W. 132 N. single cylinder engine"

Mixture response curves were obtained for 6 fuels on the I.G. test engine, the Hirsh and the I.G. Research Engine and compared with results on the B.M.W. 132 N.S.U. engine trials were also made. - A. F.

Singer
(1942)

F.D. 2867/46 Item 29

"Rating of fuels in the I.G. test engine"

Unspecified alterations to the Oppau method result in good correlation with the D.V.L. supercharge method - A.

Singer and Roth
(1942)

F.D. 2867/46 Item 40

"Effect of various bromides on the O.N."

Extension of No. 313 to ethylene dichloride, amylo-bromide, bromoform, bromobenzene, bromonaphthalene.

Wilhelmi (1942)	F.D. 2867/46 Item 45	"Determination of the anti-knock value"	- A.
Wilhelmi (1942)	F.D. 2867/46 Item 46	"Relation between fuel density, anti-knock value and mixture response curves of supercharge engines"	- A.
Witschakowski (1942)	F.D. 2867/46 Item 58	"Determination of octane number by delay period method on I.G. test diesel engine"	- A.
Singer (1943)	F.D. 2867/46 Item 59	"O.N. determination of gaseous fuels" A standard method is suggested	- A.
Witschakowski (1943)	F.D. 2867/46 Item 80	"Report on a 10-hour test run on a B.M.W. 132 single cylinder supercharged engine running on leaded iso-octane"	- A.
Witschakowski (1944)	F.D. 2867/46 Item 83	"Supercharge testing of aviation fuels under main engine conditions"	Four fuels were tested and found to leave room for considerable output increase in German engines - A. F.
Witschakowski (1944)	F.D. 2867/46 Item 86	"The A.F.D. method of investigating aviation fuels of octane numbers higher than 87 on the C.F.R. engine"	- A.

Worliczek (1944)	F.D. 2867/46 Item 89	"Knock behaviour of glycols and glycol ethers"	Modification of the I.G. test engine for substances of low cal. value. The ignitability was also determined. - A.
Seeber (1943)	F.D. 2869/46 Item 18	"The D.V.L. fuel test stand"	Thorough description of the stand which tests the knock properties of fuels according to the D.V.L. supercharge test method. - A.
Franke	F.D. 2869/46 Item 35	"The effect of different oils on the mixture response curve"	Six different oils are used with paraffinic, leaded and aromatic fuels. - A.
Witschakowski (1941)	F.D. 2869/46 Item 40	"Investigation of knocking behaviour under boosted conditions"	Mixture response curves are given for several reference fuels in the B.M.W. 132. - A.
Witschakowski (1941)	F.D. 2869/46 Item 42	"Correlation tests with Daimler Benz on the water cooled supercharge engine D.B. 601"	Mixture response curves with B.M.W. 132 compared with curves obtained from the D.B. 601 - A.
Witschakowski (1941)	F.D. 2869/46 Item 43	"Correlation tests between Intava and Oppau on the fuels HS 619-672"	- A.

- Witschakowski F.D. 2869/46 Item 44 "Correlation between the results obtained at the D.V.L., Intava and Oppau using the Politz fuel P 1001". - A.
- Witschakowski F.D. 2869/46 Item 45 "Comparison of results obtained at Intava and Oppau on the Scholven gasolines HS 629-632". - A.
- Witschakowski F.D. 2869/46 Item 46 "The influence of the B.M.W. 132 test conditions on the shape and position of the mixture response curves". Variables were magneto or battery, short or long spark plugs, spark advance, speed, A.I.T., cooling air pressure, exhaust back pressure and T.M.L. and oil content of fuel. - A.
- Witschakowski F.D. 2869/46 Item 48 "The knock behaviour of a D.B. 601 single cylinder unit on alteration of valve timing". - A.
- Witschakowski F.D. 2869/46 Item 49 "Tests on a D.B. 601 single cylinder unit using double injection". The effect of variations in proportions of fuels and of injection time. - A.
- Witschakowski F.D. 2869/46 Item 50 "The knock behaviour of fuels in air and water cooled aero engine cylinders". - A.

Witschakowski (1942)	F.D. 2869/46 Item 55	"Variation of valve timing in a B.M.W. 132 single cylinder unit".	The overlap was varied from 51° to 81°. - A.
Witschakowski (1942)	F.D. 2869/46 Item 56	"Mixture response curves on B.M.W. 801 single cylinder units at FPKM and Oppau"	The fuels were B4, C1 and C3. - A.
Witschakowski (1942)	F.D. 2869/46 Item 57	"Comparison between B.M.W. 132 single cylinder units at Intava and Oppau".	CV2B aromatics were used. - A.
Singer (1940)	F.D. 2869/46 Item 76	"Examination of aviation fuels with the I.G. test engine".	The behaviour of various fuels under varying operating conditions. - A.
Schuch (1940)	F.D. 2869/46 Item 85	"A new apparatus for determining knock intensity".	A lead tube (Schusskanal) conducts the vibrations to a pick-up and electrical circuit. ¹⁵ - A.
Schuch (1940)	F.D. 2869/46 Item 86	"The observation of knock vibrations in multi-cylinder engines"	This is easily accomplished by using the 'body ring' with a specially constructed pick-up. - A.
Singer (1940)	F.D. 2869/46 Item 87	"Criteria for assessing aviation fuels and engines".	A pos-coeff. is proposed giving the increase in O.N. as the engine method conditions are made less stringent. Engines to be rated at max. power for the knock rating requirement and with two different fuels.--A.

Witschakowski F.D. 2870/46 Item 80 "A contribution to the evaluation of the fourth series of comparative experiments on the B.M.W. 132 single cylinder supercharged test engines". - A.

Singer F.D. 2870/46 Item 100 "Correlation tests on knock test engines". Six fuels on nine C.F.R. and twelve I.G. test engines by means of motor and research methods at fourteen different laboratories. - A.

Witschakowski F.D. 2871/46 Item 5 "Determination of the anti-knock value of gasolines by measuring the delay period". Comparison with other methods and discussion. - A.

Witschakowski F.D. 2871/46 Item 11 "Ignition delay and knock resistance of fuels". To test the formula for the ignition delay $I = \frac{C_b}{p^n}$. - A.

Witschakowski F.D. 2871/46 Item 24 "Knock rating of leaded and unleaded hydrocarbon blends in the B.M.W. 132 supercharge engine".

Fuels were tested with the object of comparing the results given by the C.F.R.-Motor, the C.F.R. Research and the B.M.W. supercharge methods. - A.

Singer
(1941)

F.D. 2871/46 Item 85

"Half-yearly comparative knock tests, April 1941"

The secondary reference fuels "Zichbenzin" as well as "Z" were used for the first time together with only one evaluation table for the O.N. determination

- A.

(1943)

F.D. 2872/46 Item 1

"Report on the 5th session of the working group for knock testing".

Singer

"
pp. 5-11

"Report on the completed comparative tests of the working group for knock testing."

The accuracy of the O.N. determination of less stable gasolines were investigated; synthetic gasolines were included for the first time.

Dannefelser

"
pp. 11-19

"Observations made in testing synthetic gasolines".

Discussion of effects on knock rating of physical and chemical changes and differences between testing engines.

Ruess

"
pp. 19-24

"O.N. determinations on liquid gases".

To determine the O.N. under various conditions and propose a standard method.

Singer	F.D. 2872/46 Item 1 pp. 24-28	"The influence of operating conditions on the knock characteristics of fuels".	Variations in conditions greater than those between Motor and Research Methods were made and tested with gasolines of high paraffin, benzene and alcohol content, leaded and unleaded.
Unverhan	" pp. 28-33	" Bench tests on the usefulness of the Research and Motor methods in actual practice".	
Waldemann	" pp. 33-35	"Motor or Research Method for petroleum fuels"	Comparison of the two methods for road vehicles and test engines.
Ruess	" pp. 35-38	"Preparation of T.E.L. sols. for leading gasolines in the lab.	Standardisation of the components.
	" pp. 38	"Summary of the results of the conference".	
Singer (1942)	F.D. 2872/46 Item 14 pp. 19-22	"The development of knock rating for light fuels".	
Penzig (1942)	" pp. 37-41	"The I.G. test engine".	- F.

- Witschakowski
(1942) F.D. 2872/46 Item 14 pp. 41-44 "Supercharge tests and the corresponding test bench installations"
- Schuch
(1942) " pp. 45-48 "Electrical measuring methods used at the Technical Experimental Station, Oppau".
- Schmidt
(1941) F.D. 2872/46 Item 16 pp. 1-19 "Problems in fuel evaluation".
- Funck
(1941) " pp. 67-85 "Report on the further development of the knock measuring instrument"
- Funck
(1941) " pp. 86-113 "Experiments on the use of the acoustic-electric method for knock measurement with single and multi-cylinder engines in the lab. and on the road".
- Kessler F.D. 2872/46 Item 80 Thesis for the "Diploma"
- Significance, equipment, procedure and evaluation of supercharge testing in the B.M.W. 132. - F.
- Comprising measurements of pressure, flame progress, injection processes and knock measurements.
- A general discussion of both spark and compression ignition fuel measurements. - A.
- Change of microphone and direct conduction of sound by wire. Different frequency selectors. - A.
- Discussion of installation. Test on single cylinder engines described. Road tests on various cars. Discussion of the electrical equipment.-A.
- The effect of the operating conditions on the anti-knock value of fuels is experimentally investigated with the aid of various instruments.

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| Philippovitch
(1941) | F.D. 2873/46 Item 6
pp. 419-433 | "Engine and lab. test methods for rating the anti-knock value of fuels". | Review of methods and comparison with D.V.L. supercharge method as standard. |
| Mayer- Burgstrom
and Seeber | "
pp. 433-441 | "Anti-knock value determination for highly aromatic fuels". | Investigation of the effect of the type of aromatics on the supercharge knock limit in the B.M.W. 132 at boost air temperature of 80°C. |
| Rogener
(1941) | F.D. 2873/46 Item 8
pp. 11-19 | "Correlation of the results of laboratory investigations on self ignition of fuels with behaviour in engines". | - F. |
| Funck
(1943) | F.D. 2873/46 Item 22 | "Experience with electroacoustic knock detection in aero-engines". | Explains the principle and application of the method. Possibilities and limits of the method and experience with it. - A. |
| Singer
(1940) | F.D. 2873/46 Item 36 | "The standard fuel Z as a secondary reference fuel in anti-knock measurements". | Comparison with and advantages over benzene. Tests by 24 stations. |

Singer (1940)	F.D. 2873/46 Item 37	"Comparative tests with knock engines".	Co-operative tests to find out if the accuracy is increased by using a mixture of Eichbensin and standard fuel Z.
Singer (1942)	F.D. 2873/46 Item 41	"Half yearly comparative knock tests".	Tests at 65 stations using 107 engines.
Singer (1941)	F.D. 2873/46 Item 42 pp. 5-11.	"Result of the deductions from experiments in October 1941".	Refers to comparative (accuracy) O.N. tests according to research and motor method.
Dannefelser (1941)	" pp. 11-15	"Knock measurements with synthetic gasoline".	Discussion of discrepancies found in the knock measurements with synthetic gasoline.
Newmann (1941)	" pp. 15-18	"Calibration of knock test engines against seven engines of German test engines".	
Witschakowski (1941)	" pp. 18-22	"Test methods and octane number".	Short general review.
Singer (1941)	" pp. 22-29	"On apparatus for knock measurement".	The experience gained at the I.G. labs. with the Midgley Apparatus.

Dannefelser (1941)	F.D. 2873/46 Item 42 pp. 29-36	"Experience in the supervision of test engines".	Recounts the methods used and discusses their merits.
Kohler (1941)	" pp. 36-39	"Experience in and working with the "Oppau lattice".	
Singer (1940)	F.D. 2873/46 Item 44	"Comparative tests with knock testing engines".	Eight carburettor fuels were tested at 23 stations using 37 engines, and the motor and research methods.
Witschakowski (1941)	F.D. 2873/46 Item 45	"Effect of boost air temperature and compression ratio on the mixture response curves in the supercharge method".	Experiments and analysis of experimental results. - A.
Philippovitch (1941)	F.D. 2874/46 Item 36 pp. 1-19	"Principles of determining the knock characteristics of fuels"	Review of existing methods and of their characteristics.
Jost (1941)	" pp. 19-25	"Physico-chemical considerations in the determination of anti- knock values".	Discussion of conditions under which knock could be determined from physico- chemical data, and the application of this to practice.

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| Fromberg
(1941) | F.D. 2874/46 Item 36
pp. 25-27 | "Chemico-physical explanation
of the supercharge characteristics
of fuels" | 1.Theoretical understanding
of mixture response curves
(position, shape and
temperature dependence)
2.Calculation of mixture
response curves from O.N.
of residual gasoline and
the content of aromatics
(naphthenes). |
| Seeber
(1941) | " "
pp. 27-51 | "Knock measurements according to
the D.V.L. supercharge method". | General description and
discussion, including
experimental material. |
| Wenzel
(1941) | " "
pp. 51-55 | "The reproducibility of results
obtained with the D.V.L. super-
charge method". | |
| Witschakowski
(1941) | " "
pp. 55-65 | "Reproducibility and comparability
in the supercharge method". | |
| Benzig
(1941) | " "
pp. 65-77 | "Experiments with liquid cooled
cylinders". | To improve reproducibility
in the supercharge method
and to examine the behaviour
of fuels under these conditions. |

Wende (1941)	F.D. 2874/46 Item 36 pp. 77-83	"The D.V.L. knock test method of pressure acceleration".	Foundation and description of the D.V.L. Zeiss Ikon instrument.
Kornacker (1941)	" pp. 83-85	"The knock characteristics of engines with large valve overlap and of engines with the D.V.L. injection method with divided injections."	
Schaub (1941)	" pp. 85-97	"The supercharge test in the N.S.U. engine of the Ruhrbenzin A.G."	Description and discussion of characteristics with the aid of fuel tests.
Singer (1941)	" pp. 97-105	"Fuel rating in the small monocylinder engine (Oppau Method)".	Development, present procedure and comparison with D.V.L. method.
Philippovich (1941)	" pp. 105-107	"Calibration (reference) fuels".	Conditions for O.N. measurement; supercharge test; continuous exps.
Krafft (1941)	" pp. 107-109	"Temperature sensitivity of reference fuels for O.N. determinations".	Mixtures were preheated to various temperatures.
Seeber (1942)	F.D. 2876/46 Item 40	"Comparative supercharge tests in the B.M.W. 132 single cylinder aero-engine IV exp. series.	To find the limits of experimental error.

- Seeber (1941) F.D. 2876/46 Item 41 "Tests on six fuels according to the Oppau and the D.V.L. supercharge test methods in the I.G. test engine and the B.M.W. 132 N single cylinder aero-engine".
- Seeber and Lichtenberger (1939) F.D. 2876/46 Item 69 "Knock measurement by the D.V.L. method of pressure-acceleration". Detailed description of method and review of other important methods. Tests. - F.
- Singer, Jantsch, Witschakowski, Widmaier and Schuch (1941) F.D. 2876/46 Item 98 Report on the conference of the working groups for knock measurements. Development, results and deductions from comparative experiments carried out so far.
The blending value.
Measuring the octane number of fuels with a very high anti-knock value.
Determining the lead sensitivity of fuels. Demands made on reference fuels.
On experiments to determine intensity of knock.
Discussion and resolutions.
- Dehn (1942) F.D. 2876/46 Item 99 "Anti-knock value of aviation fuels". Effect of fuel composition on C.F.R. knock rating and rich mixture performance.

- Ammonia Works, F.D. 2876/46 Item 100 "Notes on knock testing.
Marseburg Comparative table of C.F.R.,
(1939) Delco I.G. methods of knock
testing".
- Schaub F.D. 2877/46 Item 20 "Knock measurements of synthetic
(1943) p. 140 gasolines as a function of ignition
timing".
- " F.D. 2877/46 Item 28 "Knock measurements with synthetic
(1944) gasolines. Report of the conference
of the "West Works" 9.3.44. etc".

Numerous articles also appeared in the German technical journals.

D. Power Boost.

- Triebnidge F.D. 2872/46 Item 3 "Single cylinder tests with
(1943) pp. 11-19 internal cooling".

Effect of additional injection
of water, water-methanol
mixtures and pure methanol
maximum power, consumption,
heat and mechanical demands
on engine, sensitiveness of
operation, etc. - A. F.

Lutz
(1943)

F.D. 2872/46 Item 3
pp. 25-36

"Fundamental problems in the
use of oxygen carriers to increase
the power of aero-engines".

Thermodynamical and
some practical considerations.
Calculations for hydrogen
peroxide, nitric acid,
nitrous oxide and tetra-
nitromethane. - A. F.

Willick
(1943)

"
pp. 37-48

"Test results with oxygen carriers
(GMI) in aero-engines".

Tests on full-scale
engines with and without
injection of alcohol as
coolant. - A. F.

Held
(1941)

F.D. 2873/46 Item 13

"Experiments with GMI
in the D.B. 60LF."

Varying quantities of GMI
were injected at various
heights. - A. F.

Bender

C.I.O.S. Report
No. XXII-44

"Aircraft engines additional
and temporary supercharge by the
use of nitrous oxide (N₂O) in the
engine".

B. Fuels and their Properties.

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|-------------------------------------|----------------------|--|---|
| Penzig
(1942) | F.D. 2866/46 Item 43 | "Engine Fuels" | Discussion of fuels for spark ignition and compression ignition engines. Relation between performance and volatility O.N. and ignitability. - A. |
| Bahr and
Witschakowski
(1942) | F.D. 2866/46 Item 52 | "Investigation of knock with alkyl benzenes in the B.M.W. 132 supercharge engine". | Deals with the effect on knock of (1) different synthesis (catalyst) (2) boiling characteristics, (3) chemical constitution of alkyl benzenes. - A. |
| Penzig
(1944) | F.D. 2866/46 Item 80 | "Methanol as an engine fuel". | Comprehensive examination. e.g. latent heat, V.P., calorific value and engine tests. Chief difficulty is preignition. - A. |
| Witschakowski
(1941) | F.D. 2867/46 Item 17 | "The effect of aromatic, naphthenic, ether and alcohol additions to a base gasoline on the supercharge-ability". | Knock limit curves were run according to the supercharge method and compared with reference fuel curves. |

Witschakowski (1942)	F.D. 2867/46 Item 26	"Use of hydrogen in internal combustion engines".	- A.
Witschakowski (1942)	F.D. 2867/46 Item 28	"Use of methane in the automobile engine".	Use of methane as engine fuel compared with gasoline and "bottled gas". - A.
Witschakowski and Roth (1943)	F.D. 2867/46 Item 66	"The suitability of di-isopropyl ether as an aviation fuel".	Tests on mixtures of ET100, AT.244 and di-isopropyl ether with DHD gasoline. - A.
Witschakowski and Worliczek (1943)	F.D. 2867/46 Item 78	"The suitability of pinacolone as an anti-knock component in aviation gasolines".	- A.
Worliczek (1944)	F.D. 2867/46 Item 85	"Various fuel components and their most important properties".	Tables giving properties of compounds which are used or seem suitable as fuel components. - A.
Witschakowski (1941)	F.D. 2869/46 Item 47	"Testing the knock properties of the alkyl octanes WI and WII in mixtures with B4 and CV 2B according to the supercharge method".	- A.
Witschakowski (1941)	F.D. 2869/46 Item 52	"The effect of T.E.L. and iron carbonyl on the knocking behaviour of G3 and VT 702".	- A.

- Witschakowski F.D. 2869 Item 60 "The knock behaviour of various alkyl benzoles in a B.M.W. 132 unit". - A.
- Witschakowski F.D. 2869/46 Item 61 "The knock behaviour of triptane in the I.G. test engine". Mixture response curves for triptane, di-isopropyl ether, iso-octane and aviation gasoline. Br. 2662. - A.
- Witschakowski F.D. 2869/46 Item 62 "The supercharge performance of hydrogenated polymer gasolines in blends with E.T. 110, toluene and diethyl benzene". The I.G. test engine and the B.M.W. 132 N single cylinder unit were used. Effects of hydrogenation on temperature sensitivity are shown. - A.
- Penzig F.D. 2869/46 Item 71 "Alkyl benzenes as blending agents for aviation fuels". - A.
- Witschakowski F.D. 2870/46 Item 17 "The knock behaviour of polymer gasolines in the I.G. supercharged test engine". To find the effects of hydrogenation and catalysts, the lead susceptibility and sensitivity to air intake temperatures. - A.
- I.G. Ludwigshafen F.D. 2871/46 Item 78 "Supercharged mixture response curves". Fuel VT 702 plus amyl nitrate, methyl nitrate, isobutyl nitrate, and butanone peroxide.

Oelmichen
(1942)

F.D. 2872/46 Item 90 "Hydrogen as a motor fuel".

The properties of hydrogen in relation to and the possibilities of operating a specially constructed engine.

3. Combustion in Diesel Engines.

A. General Theory and Practice.

List
(1940)

F.D. 2869/46 Item 19 "Efficiency and combustion in the diesel engine".
pp. 25-39

Discussion of the compression ignition engine cycle.
Causes of loss of efficiency.
- A.

Ullmann
(1940)

F.D. 2869/46 Item 19
pp. 61-95
"Losses in mixture formation and combustion in an engine and observations on the possible speeds of engines".

Mechanical friction losses, losses due to air movements, excessive times of combustion in high speed engines, independence on piston speed and stroke. - A.

Petersen
(1939)

- V.D.I. 83, p. 168

Study of combustion process using a bomb fitted with a double air storage chamber.

Dreyhaupt
(1939)

V.D.I. 83, p. 18

Study of combustion process
in an engine with a Lanova
air-cell combustion chamber.

Schraack
(1943)

Automobiltechnische Zeitschrift
p. 203 (1943).

Study of combustion process
in a Deutz pre-chamber engine.

B. Modifications in Engine Design and Operation.

Ernst and
Dorr
(1941)

F.D. 2872/46 Item 66 "Investigations into the
development of the self-
ignition operation of
mixture compression engines".

- F.

Ernst and
Dorr
(1941)

F.D. 2872/46 Item 99 "Experiments on a carburettor
engine with self ignition".

Using a 4 stroke engine with
usual carburettor. The
ignitability of the fuel
was raised by 100% by ethyl
nitrate. Power consumption
and combustion pressure were
measured at various compression
ratios. - F.

B.I.O.S. Final Report "German diesel engine
industry".
No. 343

- O'Farrel B.I.O.S. Final Report "Compression ignition applied to the Otto cycle. The "Ring" Process". Work on "Ring" process summarised and extensive bibliography given.
- Murphy C.I.O.S. Report "Diesel engine research and development in Germany".
- C. Evaluation of Diesel Fuels.
- Kohler F.D. 2866/46 Item 21 "Comparative experiments with I.G. Test Diesel engines 1941". Four diesel fuels were tested in I.G. Test Diesel engine at twelve different stations. - A.
- Kohler F.D. 2867/46 Item 23 "Measurement of cetane numbers above 100". A new reference fuel whose C.N. is estimated by extrapolating curves of blending C.N. - A.
- Ernst F.D. 2869/46 Item 19 pp. 113-119 "Ignition delay measurements and fuel evaluation". - A.
- Schuch F.D. 2869/46 Item 67 "A simplification of the adjustment for constant ignition delay in the I.G. test diesel engine in the measurement of the cetane number". - A.

Kohler (1940)	F.D. 2869/46 Item 74	"The measurement of cetane numbers over 100".	Blends of dibutyl and cetane were used to extrapolate the curve relating C.N. with compression ratio. A master blend was made up and used as a reference fuel. - A.
Kohler (1940)	F.D. 2869/46 Item 80	"Measurement of the cetane numbers down to zero".	By decreasing the recess in the piston crown the maximum compression ratio was increased. - A.
Schuch (1940)	F.D. 2869/46 Item 82	"Ignition delay measurement with the F.K.F.S. ignition delay instrument".	The commencement of inflammation is detected by a photocell. - A.
Singer (1940)	F.D. 2869/46 Item 83	"Relationship between cetane numbers determined in the I.G. test diesel and in the H.W.A. engines".	Five independent test series in both engines. - A.
Kohler (1939)	F.D. 2870/46 Item 95	"Correlation tests on I.G. test diesels".	Five I.G. test diesels, a Delf Thomsen and a Gardner engine, three C.F.R. and four H.W.A. engines for measuring C.N.S. - A.

Kohler (1939)	F.D. 2870/46 Item 98	"The significance of cetane number (The combustion process in relation to the cetane number)".	Tests on fuels with C.N. from 20-90. (a) at constant compression and variable ignition delay (b) constant ignition delay and variable compression. Pressure rise, peak pressure, exhaust temperature and output are also measured. - A.
D.V.M. (1942)	F.D. 2871/46 Item 23	"Special Committee for standardising the engine testing of diesel fuels at the D.V.M.".	Lecture on method of measurements; on measuring instruments, on engines and their manipulation. Discussion and resolutions. - A.F.
Kohler (1942)	F.D. 2872/46 Item 14 pp. 23-24	"Testing of diesel fuels".	
Schmidt (1941)	F.D. 2872/46 Item 16 pp. 1-19	"Problems in fuel evaluation".	A general discussion of both spark and compression ignition fuel measurements.-A.
Kneule (1941)	" pp. 20-66	"The evaluation of diesel fuels".	The physical and chemical aspects of ignition delay. Review of methods of rating. Interrelation of C.N. rate of pressure rise and knock significances of direct knock measurements. - A.

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| Staiger
(1943) | F.D. 2872/46 Item 75 | "Instrument for the measurement of ignition delay (Model 1943)". | Electrical circuit with photocell. Description of instrument and instructions for using it with various engines. - F. |
| F.K.F.S. | F.D. 2873/46 Item 17 | "Test apparatus for diesel fuels". | Description of test engine with accessory equipment suitable for investigation of the relations between fuels and engines. - A. |
| (1941) | F.D. 2877/46 Item 21 | Note on the discussion between Dr. Buchner and "Holten" on the determination of the cetane number. | |
| <u>D. Ignition Accelerators.</u> | | | |
| Drenler, Kohler and Lang
(1944) | F.D. 2867/46 Item 82 | "Investigation into the improvement of diesel oils by increasing their ignitability". | Groups studied are alkyl nitrates, and nitrites, aromatic, nitro compounds, peroxides, diazo compounds and metallo-organic compounds. - A. |
| Heinze, Marder and Veidt. | F.D. 2872/46 Item 94 | "The applicability of ignition accelerators for diesel fuels". | C.N. measured with various additives. Examination of the effect of storage. Corrosive properties, coking properties. |

E. Cold Starting and the Use of Additives.

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| Halder
(1941) | F.D. 2866/46 Item 25 | "Starting of diesel engines with the aid of heating tablets". | Improved starting at low temperatures. - A. |
| Leib
(1942) | F.D. 2866/46 Item 45 | "The behaviour of starting fuels for diesel engines inlet manifold injection". | Rating of some starting fuels. High C.N. and high vapour pressure are desirable. - A.F. |
| Leib
(1942) | F.D. 2867/46 Item 53 | "Dependence of starting properties on the C.N. in diesel fuels". | Two test diesels at -25°C., twelve fuels with C.N. from 23 to 80; 100 r.p.m. - A.F. |
| Kohler
(1940) | F.D. 2869/46 Item 70 | "Starting tests in a diesel engine". | Investigation of the various factors affecting starting.-A. |
| Leib
(1942) | F.D. 2872/46 Item 14
pp. 25-27 | "On starting aids for diesel engines at low temperatures". | Development of "start coal" which consists of ash-free coal extract, oxygen carriers and ignition promoter. |
| Demmer
- | F.D. 2872/46 Item 79 | Thesis for the "Diploma" | The starting properties of fuels to be investigated. The F.K.F.S. engine is used together with various ignition accelerators and the results evaluated. |

- Schutz
(1943)
F.D. 2872/46 Item 81 Thesis for the "Diploma"
The ignition properties of hydrocarbon air mixtures in the diesel engine and the effect of ethyl nitrate.
- Gerschler
(1943)
F.D. 2872/46 Item 82 Thesis: "To carry out investigations on the effect of the chemical pre-reaction on the starting characteristics in diesel operation".
An arrangement is to be developed which returns the unignited, but compressed exhaust gases of the starting to the combustion chamber.
- Mellintin,
Fenerhalm,
Martienssen.
(1940)
F.D. 2873/46 Item 28 "Cold starting tests on automobile diesel engines".
D.V. in direct injection and A.H.N. direct injection engines at -15°C. test with various starting aids. - A.
- F. Fuels and their Properties.
- Penzig
(1942)
F.D. 2866/46 Item 43 "Engine Fuels".
Discussion of fuels for spark ignition and compression ignition engines. Relation between performance and volatility, O.N. and ignitability. - A.
- Roth
(1943)
F.D. 2866/46 Item 69 "On ethers of higher cetane number".
Tables and discussion of C.N. and chemical constitution. Supplied compounds are included. - A.

- Penzig
(1944)
- F.D. 2866/46 Item 84 "Nitroalkyls as fuels".
- Tables in which mixture calorific value, weight and volume requirements, combustion temperatures and other quantities are measured. Anti-knock value and cetane number are also measured and discussed. - A. F.
- Roth
(1944)
- F.D. 2867/46 Item 92 "The cetane number of multivalent thioethers and polysulphides".
- Engine tests for the detection of nozzle troubles were also made. - A.
- Rixmann
(1940)
- F.D. 2869/46 Item 19 pp. 9-25 "Liquid and producer gas operation of the diesel engine".
- Kohler
(1939)
- F.D. 2869/46 Item 65 "Power gas as a diesel fuel".
- Summary of present experience and research. - A.
- No alterations were to be made to the engine. - A.
- Dreyhaupt
(1941)
- F.D. 2873/46 Item 1 "Combustion of 'liquid gas' (producer gas) propane-butane mixture, in a normal diesel engine".
- Deals mainly with experiments on the injection system.
- Klaus
(1940)
- "V.D.I. 84, p. 699.
- Running automotive diesel engines on gasoline and other fuels.
- Dreyhaupt
(1943)
- "V.D.I. 87, p. 196
"Use of driving gas in the pure diesel process".