Gathering of the Green
2002 Winter Convention

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Moline, IL

Spark Plugs used on John Deere Tractors

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Outline of Talk

- History of Spark Plug Development
- Technical Points about Plugs
- OE Plug Suppliers to John Deere
  - Identification and brief history
- Summary of Plugs Used by Model and Year
  - Came in tractors from the factory
  - Waterloo Boy to end of 30 Series in 1960
- Recommended Plugs for Special Situations
- Proper Spark Plug Usage
- Modern Plug Equivalents
- Summary

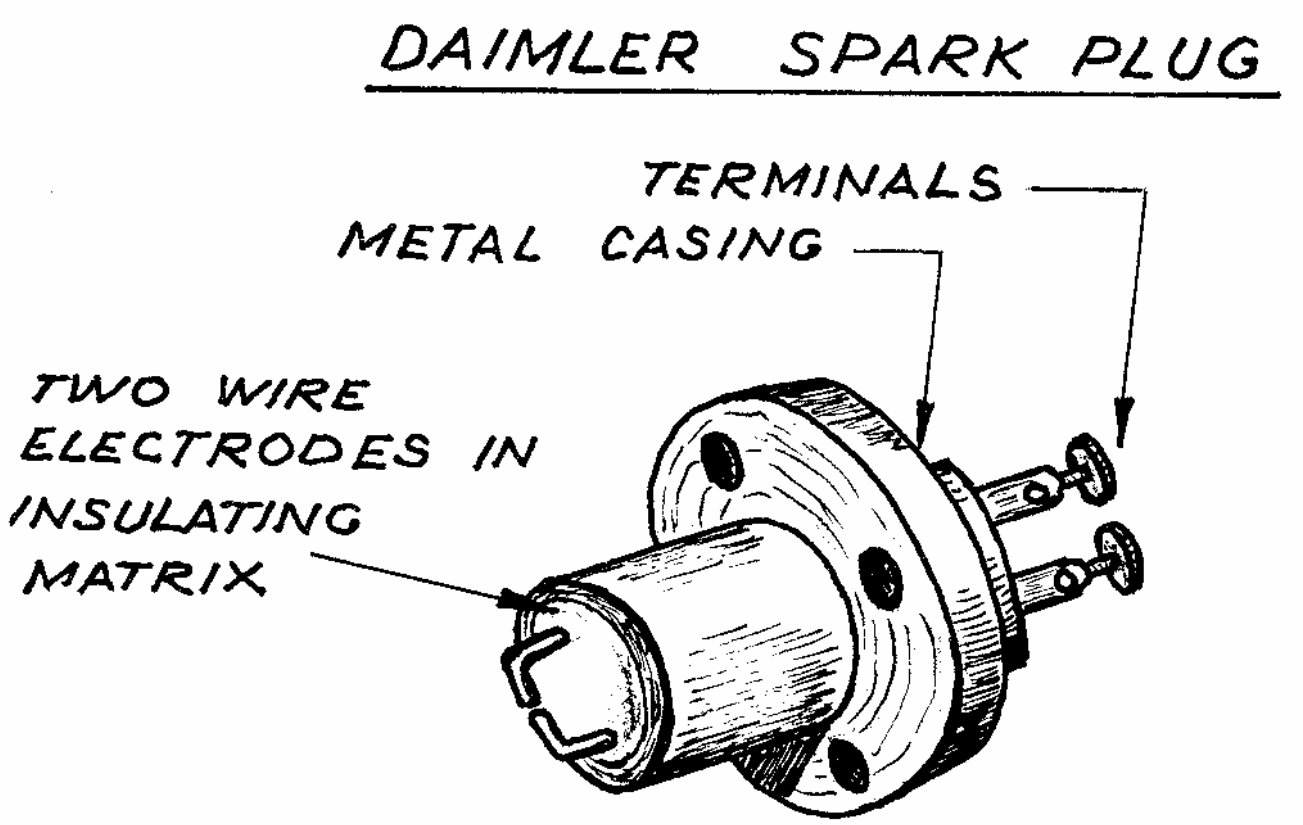
History of Spark Plug Development

- **Lenoir, working in Paris, developed first production internal combustion engine in 1860**
  - **Used a “sparking device”**

  - **Patented “Sparking Plug” in 1860**

History of Spark Plug Development, continued

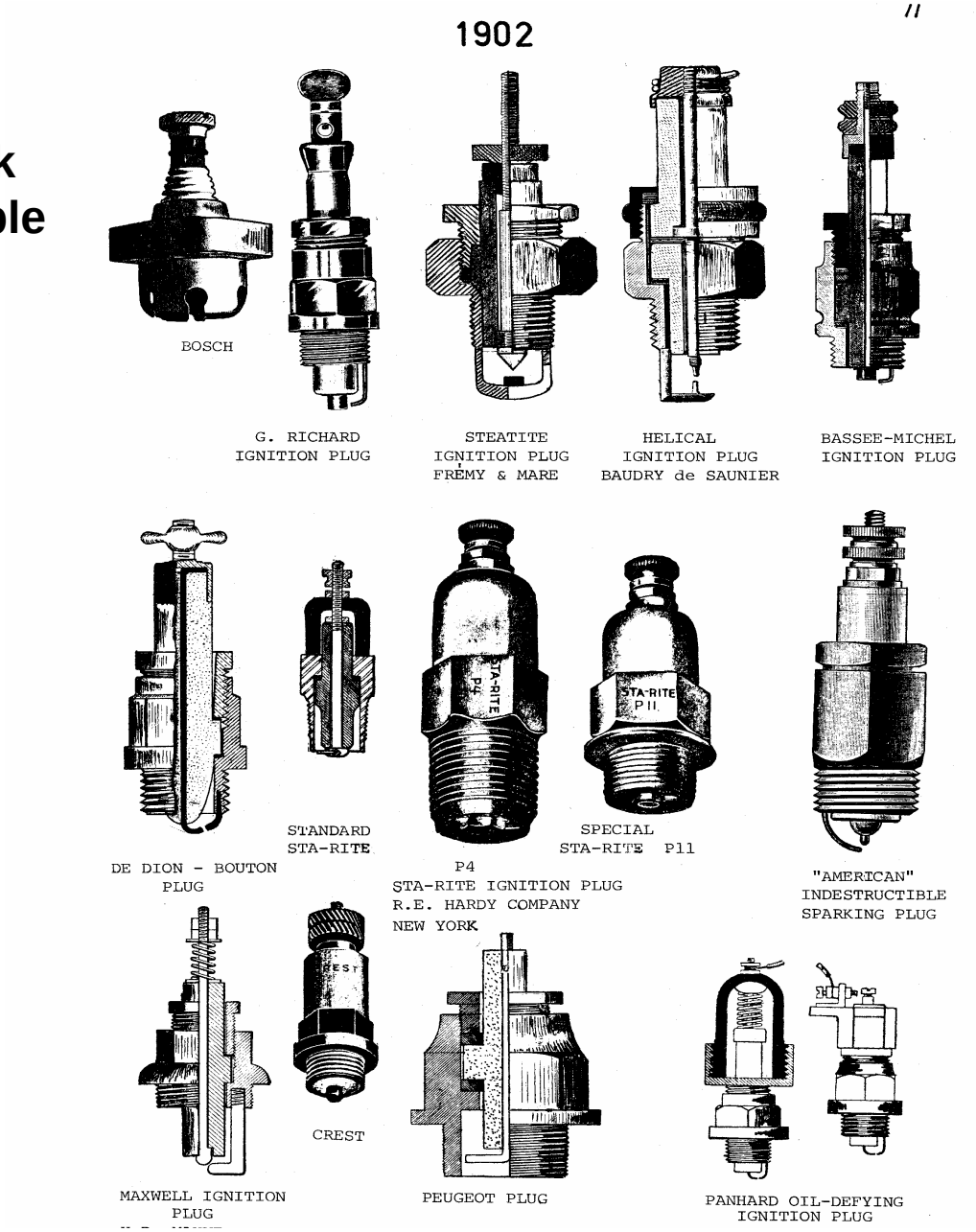
- **Early Spark Plugs were often bolted on**



History of Spark Plug Development, continued

- **Much early plug development in Europe**
  - **Count De Dion standardized on 18mm**
  - **Plugs imported regularly to USA**
- **Association of Licensed Automobile Manufacturers (ALAM) adopted 7/8”-18 thread as standard in1908**
- **Henry Ford disliked metric, was in disagreement with ALAM, selected 1/2” pipe thread for Model T in 1908**
- **Hence, three plug thread types from the get-go**

Examples of spark plug types available in 1902



History of Spark Plug Development, continued

- **Many innovations(?) from 1900-40**
  - **Double-ended plugs** ***Twin, Hire Fire, Dubl Servis***
  - **Primer plugs** ***Champion, Red Head, Mosler***
  - **Coil plugs** ***Perfex, Primary, Orswell***
  - **Self-Cleaning** ***Turn Clean, Myers, Fouless, Fan Flame***
  - **Breather Plugs** ***LeVac Northwind, Shurnuff***
  - **Detachable Plugs** ***EverClean, Breech Block***
  - **Double Plug** ***Bosch, Edison, Twin Tact***
  - **Visible Spark** ***Viz Spark, Window***
  - **Model T Plugs** ***For A Ford, Long Henry, Henrys'***
  - **Radioactive Plugs** ***Firestone Polonium***

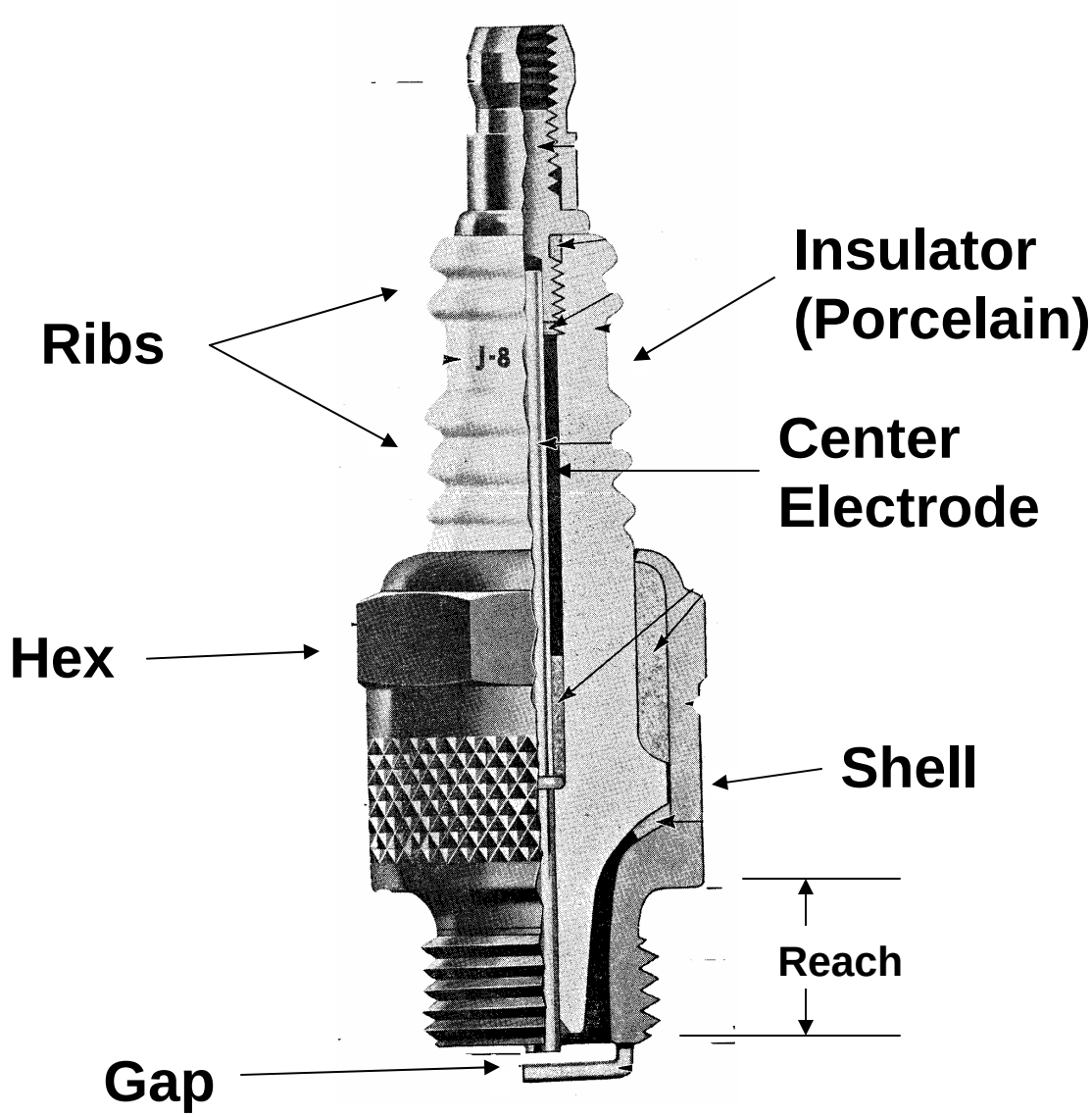
History of Spark Plug Development, continued

- **Spark Plug Collectors of America collect plugs**
  - **Over 5000 different plugs on Master List**
  - **Meetings at Portland and Hershey shows**
  - **“The Ignitor” quarterly publication**

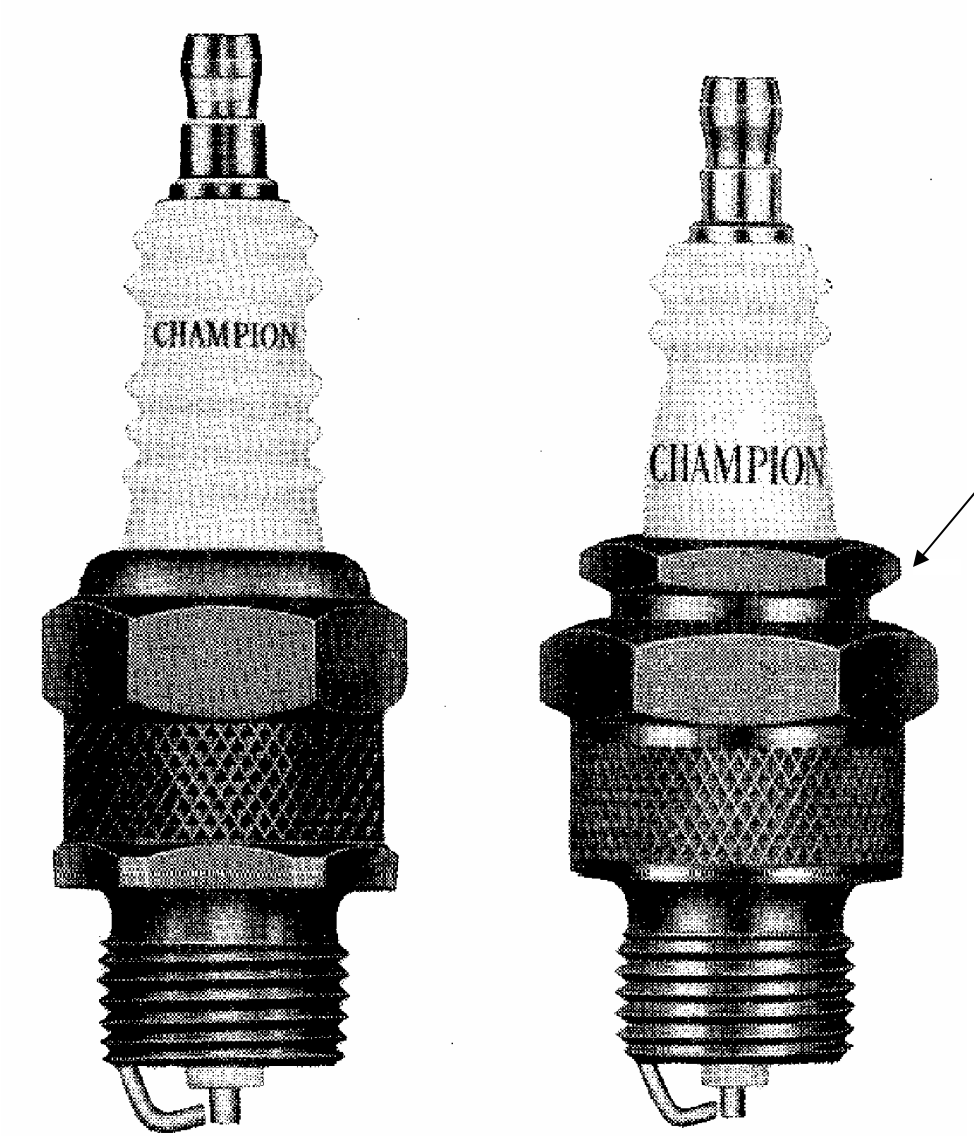
Technical points about plugs (Terminology)

- **We will look at**
  - **Construction of spark plugs**
    - **Base and hex sizes**
    - **Insulators**
  - **Two-piece “take-aparts”**
  - **“Reach” and “skirt” of a plug**
  - **Ground electrode designs**
  - **Heat Range**
    - **Definition**
    - **Illustrations**
    - **Tables**
    - **Application**
  - **Miscellaneous comments**

Components of a Spark Plug

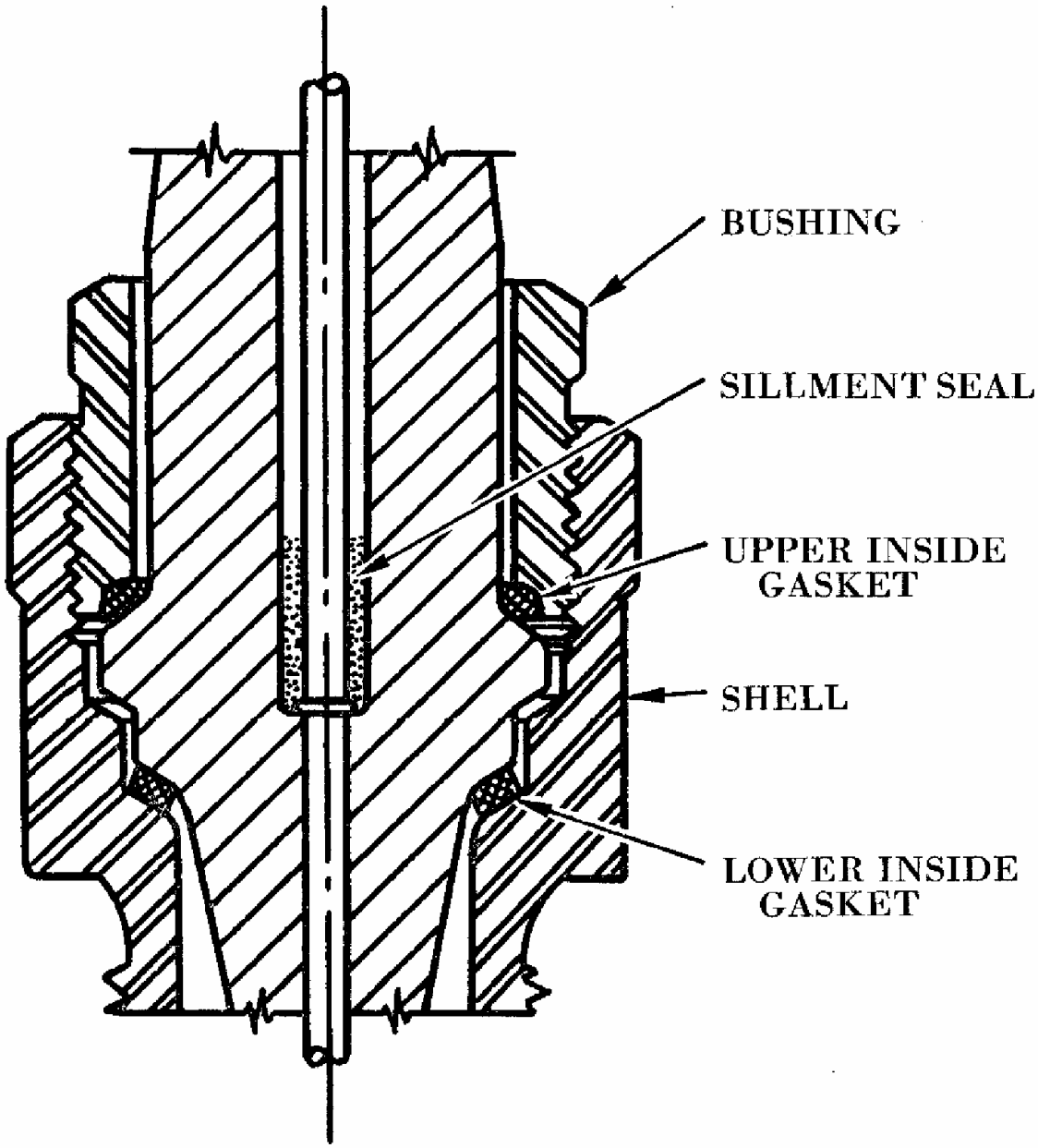


One Piece Plug

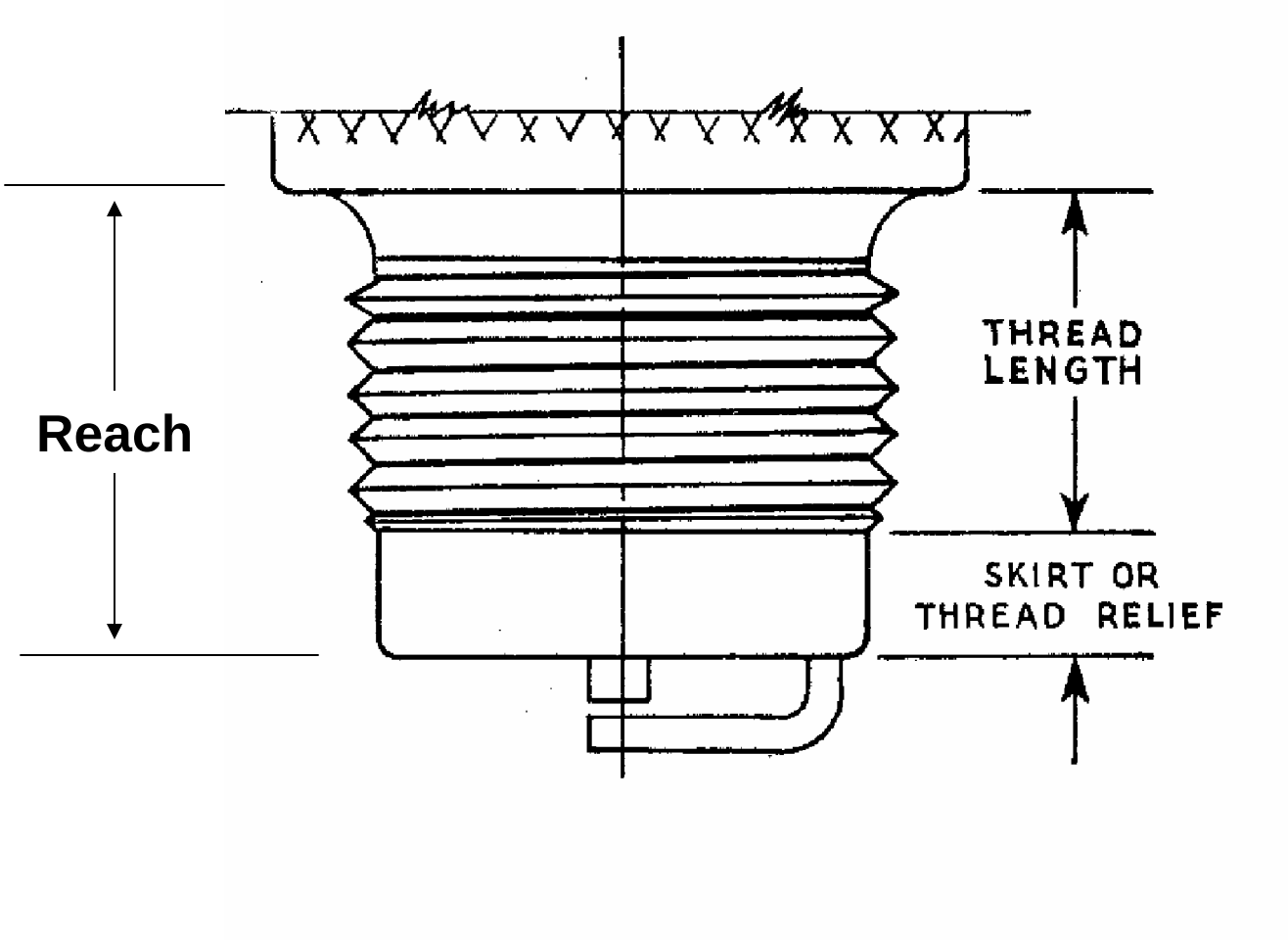


Bushing

Two Piece "Take Apart" Plug

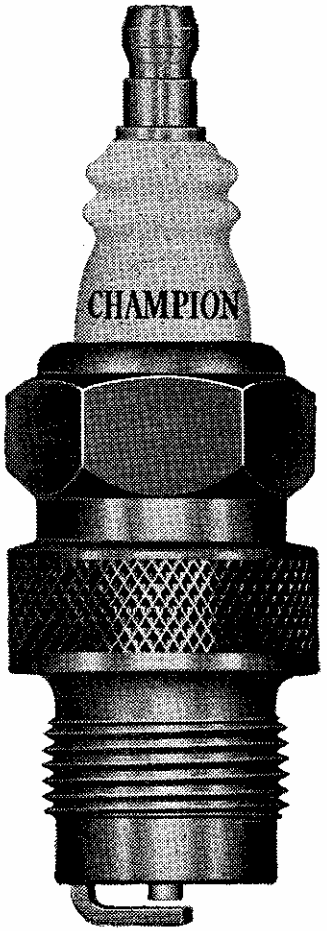


TYPICAL TWO-PIECE CONSTRUCTION



Reach = Thread Length + Skirt

1 Com. (7/8″-18)
Regular Reach

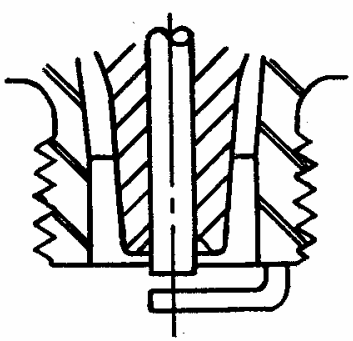


3 Com. (7/8″-18)
Long Reach

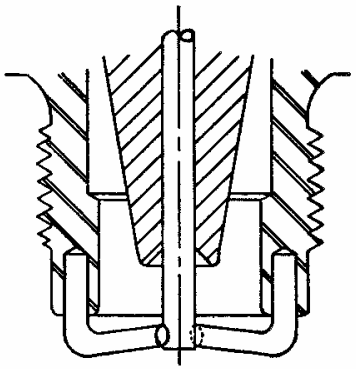
LONG REACH

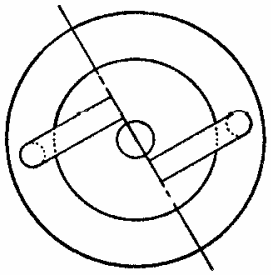
Plug Type	Thread Size
3 Com.	7/8″-18
2 Com.L	7/8″-18

Types of Electrodes

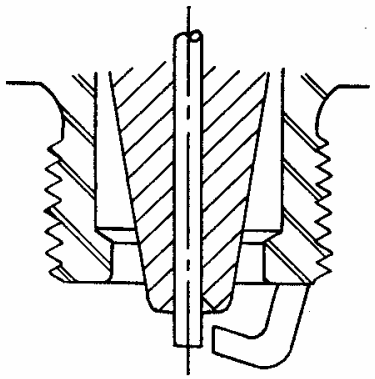


H10
1Com
8Com

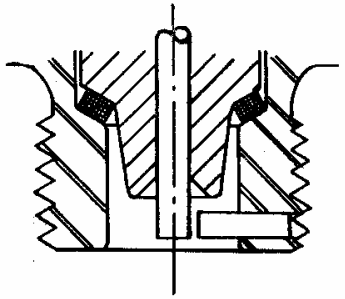




2ComL
33



C4

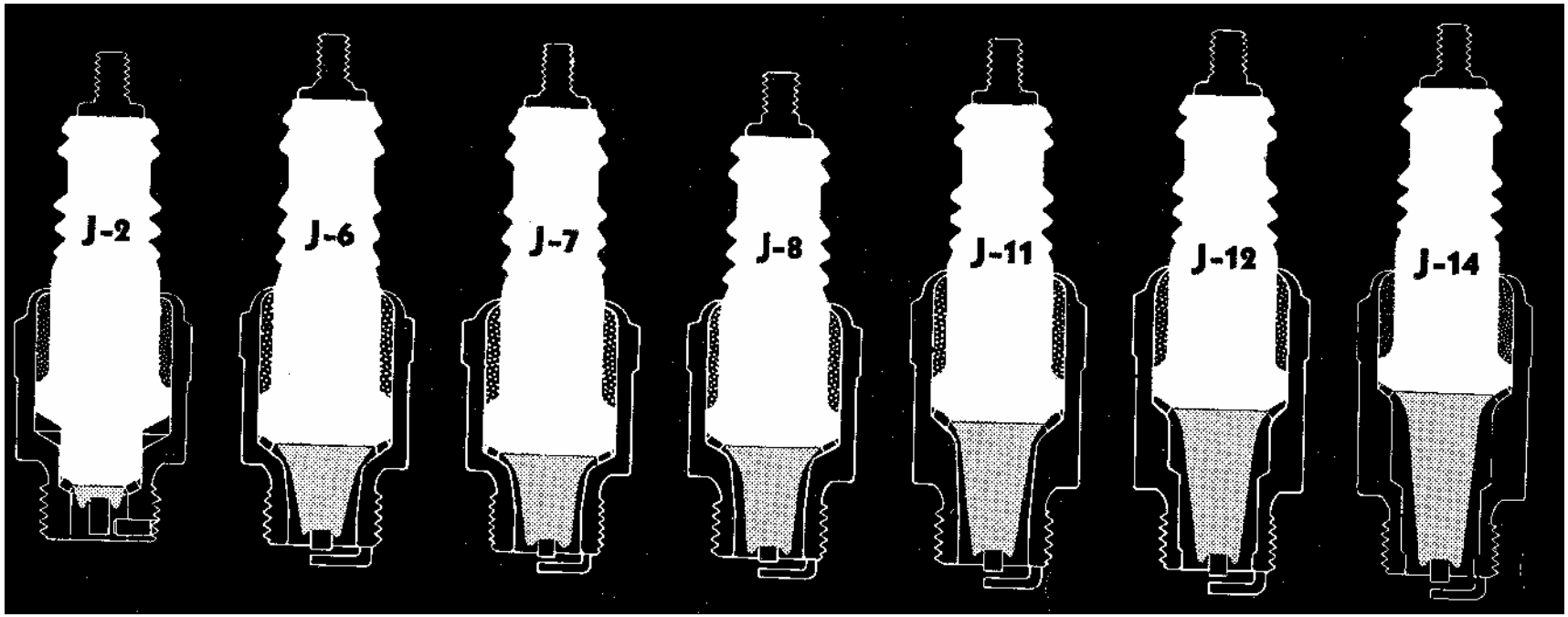


Racing
Plugs

Terminology, continued (Miscellaneous)

- **“Heat Range” : classification of plugs according to ability to transfer heat**
  - **Cold plug: transfers heat rapidly – use in Heavy Service applications**
  - **Hot plug: transfers heat slowly – use in Light Service applications**
  - **Heat range determined primarily by distance between insulator tip and (1) gasket where it meets shell, and (2) the shell itself**

- **Cold plugs on left, Hot plugs on right**



- **For a Hot plug, heat generated at tip of plug has to travel farther to reach water-cooled shell**

Terminology, continued (Heat Range)

- **Heat Range is KEY to selection of proper plug for satisfying tractor operation!!!**
- **Most plugs removed from John Deere tractors are oily or sooty. This a clear sign of too COLD a plug.**
- **For most operation of antique tractors, the hottest plug which can be used should be tried (ensuring it does not interfere with mechanical operation of motor)**
- **Signs of too hot a plug are pre-ignition (ignition of fuel-air mixture from hot plug tip, not spark), and a white, burned tip upon inspection**

Terminology, continued (Heat Range)

- **Application charts, and John Deere tractors from the factory, all assume "Normal Service", which may not be correct for our purposes**
- **John Deere was slow to provide recommendations for hotter plugs – first recognition FSB 144 (April, 1943)**
  - **Note: C-H below should be C-4**

Size	Make	Part No.	Regular Hot Plug	Very Hot	Extremely Hot
7/8″	Edison	AA2044R	(X-46)	33*	32*
7/8″	Champion	AC600R	(No. 2 Commercial L)	C-H*	No. 3 Commercial*
18 M.M.	Edison	AH702R	(Z-19)	43*	42T
18 M.M.	Champion	AH803R	(No. 8 Commercial C)	C-7*	No. 9 Commercial*

(*Purchase locally from a supply house)

Terminology, continued (Heat Range)

- **FSB 156 (October 1946) assigned John Deere part numbers to hotter plugs**
- **Introduction of gasoline engines for Models A and B in 1947 caused headaches – too cold plugs – 6Com - were initially used**
- **By FSB 165 (November 1949), they had designed a new optional gas manifold and gone to AC 88L-Com plugs as Champion did not make a plug hot enough**

Terminology, continued (Miscellaneous)

- **Will hot plugs solve all fouling problems? – Nope!**
- **Hot plugs will slow down fouling if due to engine**
  - **Oil fouling**
    - **Worn cylinders**
    - **Worn intake valve guides**
    - **Worn rings**
    - **Worn pistons**
  - **Gas fouling**
    - **Carburetor problems**
    - **Weak spark**
    - **Old fuel (or bad new fuel?)**
    - **Too cold operating temperature**
- **New, hot plugs will not solve engine problems**
- **Fouled plugs are only the messenger**

Companies providing spark plugs to John Deere, and their histories

- **Five companies provided plugs used in production by John Deere to 1960**
  - **Splitdorf Electrical Company, Newark, NJ**
  - **AC Spark Plug Division, GM, Flint, MI**
  - **Champion Spark Plug Company, Toledo, OH**
  - **Edison-Splitdorf Company, West Orange, NJ**
  - **Electric Auto-Lite Company, Toledo, OH**
- **Brief history of each company, and years of service to John Deere**

Companies: Splitdorf Electrical Company

- Building spark plugs by 1907
- Bought out by Edison Company in 1932
- Built Dixie and Aero magnetos
- Early spark plugs were unique hexagonal shape, with a mica insulator and green porcelain surface
- Provided plugs to John Deere from 1918 – 1924

Companies: AC Spark Plug Division, General Motors

- **William Durant (founder of GM) hired Albert Champion from Champion Spark Plug Company to develop reliable, US made spark plugs for GM**
- **Albert Champion was a French bicycle racer who set up an importing business for spark plugs, and began building his own**
- **Champion Ignition Company (CICO) incorporated 10/08**

Companies: AC Spark Plug Div., GM, cont.

- Company expanded rapidly as GM added Cadillac and Oakland to Buick and Oldsmobile
- 1922 lawsuit with Champion Spark Plug Company resulted in name change to AC Spark Plug Company (Albert Champion's initials)
- Company is presently AC-Delco, an affiliate of GM
- Connection with John Deere
  - April 1918 ad – "supplier to Deere Tractors"
  - On and off relationship – supplier 1930-35, then 1949-present

Companies: Champion Spark Plug Company

- **Organized by Frank Stranahan (a Boston entrepreneur) prior to 1905**
- **First business to associate with Albert Champion – hired to develop spark plugs**
  - **Durant bought out Champion's interest in Champion Spark Plug, but Stranahan retained Champion name**
- **Robert Stranahan graduated from Harvard, joined Frank, and made a key development for sealing 2 piece plugs**

Companies: Champion, continued

- Stranahan courted John Willys of Willys-Overland – agreed to move to Toledo to supply Willys with plugs
- Won Ford contract for 1911 – off and running!
- Champion Spark Plug Company sold out in 1991, stopped production in Toledo, now owned by Federal-Mogul
- Connection with John Deere
  - Provider of plugs from 1923 – present

Companies: Edison-Splitdorf, subsidiary of T. A. Edison Co.

- **Formed 1932 via purchase of Splitdorf Electrical**
- **Developed and sold Edison-Splitdorf CD and RM magnetos to John Deere starting 1936**
- **Supplier of spark plugs to John Deere starting July 1938**
- **November 1947 Edison acquired assets of Edison-Splitdorf, plugs now carry only Edison name**

Companies: Edison-Splitdorf, continued

- **May 1949 Wico purchased Edison magneto line**
- **December 1950 Edison stopped making spark plugs**
- **Edison Company bought by McGraw Electric in 1957**
- **John Deere bought plugs from Edison (-Splitdorf) from 1938 – 1950**
- **Appears they were not primary supplier – hard to find NOS plugs**

Companies: Electric Auto-Lite Company

- Formed 1936 to provide plugs to Chrysler
- Late, but successful entry into spark plug business
- Presently owned by Honeywell International
  - Excellent history available on www
- John Deere began using plugs in Dubuque-built tractors by 1952
- Alternate supplier to Waterloo Tractor Works by 1955
- Produced plugs under Prest-O-Lite name and Motorcraft name

Summary of Plugs used during Production

- **What plugs were in tractors when they rolled off the line?**
  - **Information presented by years for the following models and groups of models:**
    - **Waterloo Boy**
    - **D**
    - **C and GP**
    - **A**
    - **B**
    - **L series**
    - **G**
    - **H**
    - **M series**
    - **50-70 series**
    - **20 and 30 series**
    - **Pony motors**

Summary of Production Plugs, continued

- **Documentation sources include:**
  - **Decision records**
  - **Field Service Bulletins**
  - **Parts Books covering years of production**
  - **Branch House Service Bulletins**
  - **Spark Plug company catalogs and application charts**
  - **Early Farm Implement News magazine articles**
  - **Magazine ads**
  - **SPCOA “Ignitor” magazine and members**
  - **J. R. Hobbs books provided (most) beginning and ending production dates**
  - **Generous sharing of information by several speakers at this conference**

Summary of Production Plugs, continued

- **Cases where dates cannot be pinned down are noted in *ITALICS***
- **Information is my “best” at present, but new information continues to turn up – if you have any I would appreciate your sharing it with me**

Plugs: Waterloo Boy

- Production began 8/14 (R) and ended 10/24 (N)
- **Early information sketchy**
  - **Reprints of Instruction/Parts List No.3 (R), and No. 5 (8/1/17) (R) do not list spark plugs**
  - **Parts List No. 7 (4/1/20) provides p/n 410R and picture characteristic of Splitdorf plug**
  - **Splitdorf ad from 1918 wholesaler's catalog lists Splitdorf P141 plug for Waterloo Boy**
- **Based on years of experience, Ken Kass believes that Splitdorf plugs were used on Waterloo Boy tractors**
- **Splitdorf P141 1/2" Extra Long pipe thread**

8/14 – 10/24

Plugs: Model D

- Production began 6/23 and ended 7/53
- **Early**
  - **Champion 7 1/2” pipe thread** **6/23 – 9/29**
    - **Not to be confused with Champion 7 18mm plug!**
- **Champion renamed their 7 to 31**
  - **Champion 31 1/2” pipe thread** **9/29 – 11/30**
- **John Deere changed to a block using 7/8” plug**
  - **Champion 3X, C4, or AC L-12** **11/30 – 7/10/35**
- **John Deere changed to Champion 2** **7/10/35 – 1/37**
- **Champion introduced Commercial version of 2**
  - **Champion 2Com** **1/37 – 7/25/38**

Plugs: Model D, continued

- John Deere added Edison Splitdorf as a plug supplier – already using magnetos
  - Champion 2Com or E-S X-46 7/25/38 – 4/39
- John Deere introduced styled D
  - Champion 2Com or E-S X-46 4/39 – 1/40

Plugs: Model D, continued

- **Champion introduced a Long version of 2Com**
  - **Champion 2ComL (2-Rib) or E-S X-46** 1/40 – 12/50
- **Champion changed from 2-Rib to 5-Rib plugs in 1950, E-S stopped production 12/50**
  - **Champion 2ComL (5-Rib)** 12/50 – 12/52
- **AC replaced E-S as supplier of plugs**
  - **Champion 2ComL (5-Rib) or AC 77L-Com** 12/52 – 7/53

Plugs: Models C and GP

- C built 8/27 – 4/28, GP built 8/28 – 3/35
- **Production of Model C**
  - **Champion 7, same p/n as D** **8/27 – 4/28**
- **John Deere production of Model GP - small bore, 1/2” pipe thread plug**
  - **Champion 7** **8/28 – 9/1/29**
- **Champion replaced 7 plug with 31 plug**
  - **Champion 31** **9/1/29 – 11/20/29**

Plugs: Models C and GP, continued

- **John Deere changed to Champion G24 plug, replaced by 33**
  - **Champion G24 (Champion 33)** 11/20/29 – 8/30
- **John Deere changed to a 7/8” plug with introduction of big-bore GP**
  - **AC L-12** 12/30 – 3/35
- **John Deere added Champion 3X and C4 plugs**
  - **Champion 3X, C4 and AC L-12** 3/8/32 – 3/35

Plugs: Model A

- Production began 3/34 and ended 5/52
- **Production of Model A begins**
  - **Champion 3X or C4, or AC L-12** **3/34 – 7/10/35**
- **John Deere changed to a Champion 2**
  - **Champion 2** **7/10/35 – 1/37**
- **Champion introduced commercial version of 2**
  - **Champion 2Com** **1/37-7/25/38**
- **John Deere added Edison-Splitdorf as a supplier**
  - **Champion 2Com or E-S X-46** **7/25/38 – 9/39**
- **John Deere changed block to use 18mm plug**
  - **Champion 8ComC or E-S Z-19** **9/39 – 2/47**

Plugs: Model A, continued

- **John Deere introduces gasoline engine in addition to all-fuel engine**
  - **Champion 8ComC or E-S Z-19** 3/47 – 12/50 All-Fuel
  - **Champion 8ComC** 12/50 – 5/52 All-Fuel
  - **Champion 6Com or E-S Z-142** 3/47 – 1948 (*est*) Gasoline
  - **Champion 8Com or E-S Z-142** 1948 (*est*) – 2/50 Gasoline
  - **AC 88L-Com or E-S Z-142** 2/50 – 12/50 Gasoline
  - **AC 88L-Com** 12/50 – 5/52 Gasoline
- **AR - AO production continued until 5/53**
  - **Champion 8ComC** 12/50 – 5/53 All-Fuel
  - **Champion introduces 10Com-64 hot plug**
  - **AC 88L-Com or Champion 10Com-64** 12/52 – 5/53 Gasoline

Plugs: Model B

- Production began 9/34 and ended 6/52
- **Production of Model B begins**
  - **Champion 3X or C4, or AC L-12** 9/34 – 7/10/35
- **John Deere changed to a Champion 2**
  - **Champion 2** 7/10/35 – 1/37
- **Champion introduced a commercial version of 2**
  - **Champion 2Com** 1/37 – 7/25/38
- **John Deere added Edison-Splitdorf as a supplier**
  - **Champion 2Com or Edison-Splitdorf X-46** 7/25/38 – 1/40
- **Champion introduces a Long version of 2Com plug**
  - **Champion 2ComL or E-S X-46** 1/40 – 8/40

Plugs: Model B, continued

- **John Deere changes to an 18mm plug**
  - **Champion 8ComC or E-S Z-19** 9/40 – 1/47
- **John Deere introduces gasoline engine in addition to all-fuel engine**
  - **Champion 8ComC or E-S Z-19** 2/47 – 12/50 All-Fuel
  - **Champion 8ComC** 12/50 – 6/52 All-Fuel
  - **Champion 6Com or E-S Z-142** 2/47 – 1948 (*est*) Gasoline
  - **Champion 8Com or E-S Z-142** 1948 (*est*) – 5/50 Gasoline
  - **AC 88L-Com** 5/50 – 6/52 Gasoline

Plugs: Models 62, L, and LA

- Production began 3/37 and ended 7/47
- **First tractor produced by John Deere to burn only gasoline – initially used 7/8 – 18 thread**
- **Production of the 62**
  - **Champion 1Com** **3/37 – 7/37**
- **Production of the Unstyled L**
  - **Champion 1Com** **9/37 – 4/38**
- **Production of styled L with Hercules engine**
  - **Champion 1Com** **8/38 – 8/41**
- **Production of styled L with John Deere engine – change to 14mm plug**
  - **Champion H10** **7/41 – 7/46**
- **Production of the LA (John Deere engine)**
  - **Champion H10** **8/41 – 8/46**

Plugs: Models 62, L, and LA, continued

- **There is a problem pinning down the AL2785T part number in terms of a plug manufacturer's number.**
- **I suspect it corresponds to a Champion H10, but the number is gone by 2/51, when it is replaced by AM514T, the H10 number for the Dubuque series.**
- **Why did not the L and LA with John Deere engines retain their number, and why did they utilize the M series part number?**

Plugs: Model G

- Production began 5/37 and ended 1/53
- **Production of the unstyled G**
  - **Champion 2Com** **5/37 – 7/25/38**
- **John Deere added Edison Splitdorf as a supplier**
  - **Champion 2Com or Edison Splitdorf X-46** **7/25/38 – 1/40**
- **Champion introduced commercial version of 2**
  - **Champion 2ComL or E-S X-46** **1/40 – 2/42**
- **John Deere began producing GM and changed to 18mm plugs**
  - **Champion 8ComC or E-S Z-19** **2/42 – 3/47**

Plugs: Model G, continued

- **John Deere introduced the new G, retained all-fuel engine**
  - **Champion 8ComC or E-S Z-19** 3/47 – 12/50
- **Edison-Splitdorf stopped producing plugs in 12/50**
  - **Champion 8ComC** 12/50 – 1/53
- **John Deere did introduce the AC 86-Com in 12/52 to replace the Edison plugs; however, since production ended in 1/53, it is possible some of the last Gs came with AC 86-Com plugs.**

Plugs: Model H

- Production started 1/39 and ended 2/47
- **The Model H was the first John Deere to use an 18mm plug, hence the plug part numbers have H in their prefix. The earliest H's used plugs with part number AH652R, a plug presently unknown. That part number shows up only in the Instruction and Parts List dated 11/38 (prior to production). It is possible it was a Champion plug.**
- **Production of the Model H begins. Champion 8ComC is not in 1/1/40 catalog, but is in 1/40 IPL for Model A**
  - **Edison-Splitdorf Z-19** 1/39 – 1/40
- **Champion introduces 8ComC**
  - **Champion 8ComC or E-S Z-19** 1/40 – 2/47

Plugs: Model H, continued

- **Champion 8ComC Plug**
  - **NOT to be confused with more easily found 8Com**
    - **8ComC is 2-piece plug, 8Com not**
  - **Has fully glazed insulator nose**
    - **Retards adherence of combustion products**
    - **Designed for kerosene, distillate, non-leaded fuels**
    - **Glaze susceptible to attack by lead oxides**
  - **Used chiefly in John Deere tractors**

Plugs: Model M Series

- Production began 3/47 and ended 9/52
- **Early**
  - **Champion H-10** **3/47 – Mid-1951 Gasoline**
- **Production of all-fuel version starts between 3/50 and 1/52**
  - **Champion J-14** **Mid-1951 – 9/52 All-Fuel**
  - **Champion H-10** **Mid-1951 – 9/52 Gasoline**
- **AC and AutoLite were not yet suppliers of spark plugs for Dubuque tractors**

Plugs: Model 40 Series

- Production began 10/52 and ended 10/55
- **AC and AutoLite (A-L) were both suppliers by 5/1/53**
  - **Champion H10, AC45L, or A-L A(N)7** **10/52 – 10/55 Gasoline**
  - **Champion J14** **4/53 – 10/55 All-Fuel**

Plugs: Model 50

- Produced from 7/52 (LP 1/55) to 5/56
  - **Champion 8ComC** 7/52 – 2/54 (*est*) All-Fuel
  - **Champion 8Com** 2/54 (*est*) – 5/56 All-Fuel
  - **AC 86-Com** 7/52 – 5/56 All-Fuel
  - **AutoLite BD9 (?)** 9/54 – 5/56 All-Fuel
  - **AutoLite BT-8(J)** 1/56 – 5/56 All-Fuel
  - **Champion 8Com, AC 86Com** 7/52 – 5/56 Gasoline
  - **AutoLite BT-8** 1/56 – 5/56 Gasoline
  - **Champion 6Com, AC 85Com, A-L BT-4** 1/55 – 5/56 LP

Plugs: Model 60

- Produced from 3/52 (LP 9/53) to 11/56
  - **Champion 8ComC** 3/52 – 2/54 (*est*) All-Fuel
  - **Champion 8Com** 2/54 (*est*) – 11/56 All-Fuel
  - **AC 86-Com** 3/52 – 11/56 All-Fuel
  - **AutoLite BD9 (?)** 9/54 – 11/56 All-Fuel
  - **AutoLite BT-8(J)** 1/56 – 11/56 All-Fuel
  - **Champion 8Com, AC 86Com** 3/52 – 11/56 Gasoline
  - **AutoLite BT-8** 1/56 – 11/56 Gasoline
  - **Champion 6Com, AC 85Com, A-L BT-4** 9/53 – 11/56 LP

Plugs: Model 70

- Produced from 3/53 (LP 8/53) to 6/56
  - **Champion 8ComC** **3/53 – 2/54 (*est*) All-Fuel**
  - **Champion 8Com** **2/54 (*est*) – 6/56 All-Fuel**
  - **AC 86-Com** **3/53 – 6/56 All-Fuel**
  - **AutoLite BD9 (?)** **9/54 – 6/56 All-Fuel**
  - **AutoLite BT-8(J)** **1/56 – 6/56 All-Fuel**
  - **Champion 8Com, AC 86Com** **3/53 – 6/56 Gasoline**
  - **AutoLite BT-8** **1/56 – 6/56 Gasoline**
  - **Champion 6Com, AC 85Com, A-L BT-4** **8/53 – 6/56 LP**

Plugs: Model 320 Series

- Production began 6/56 and ended 7/58
  - **Champion H10, AC 45L, A-L AL7** **6/56 – 7/58 Gasoline**
  - **Champion J14** **6/56 – 7/58 All-Fuel**

Plugs: Model 420 Series

- Production began 10/55 (LP 8/57) and ended 7/58
  - **Champion H10, AC 45L, A-L AL7** **10/55 – 7/58 Gasoline, LP**
  - **Champion J14** **10/55 – 7/58 All-Fuel**

Plugs: Model 330 Series

- Production began 7/58 and ended 2/60
  - **Champion H10, AC 45L, A-L AL7** **7/58 – 2/60 Gasoline**
  - **Champion J14** **7/58 – 2/60 All-Fuel**

Plugs: Model 430 Series

- Production began 7/58 and ended 2/60
  - **Champion H10, AC 45L, A-L AL7**
  - **Champion J14**

7/58 – 2/60 Gasoline, LP

7/58 – 2/60 All-Fuel

Plugs: Models 520-30, 620-30, and 720-30

- **All used same plugs! This was easy-**
  - **Champion 8Com, AC 86Com, A-L BT-8** — All-Fuel and Gasoline
  - **Champion 6Com, AC 85Com, A-L BT-4** — LP

Plugs: R Starting Engine

- Production started 1/49 and ended 4/55
  - **Champion 6Com or Edison Z142** **1/49 – 12/50**
  - **Champion 6Com** **12/50 – 11/54**
  - **Champion 8Com or AC 86Com** **11/54 – 4/55**

Plugs: All V4 Starting Engines

- **70D, 80D, 720-30D, 820-30D**
  - **Champion J8 or AC 45M** **10/54 – end of production**

Recommended plugs for special situations

- **Normal Service**
  - **Production plugs**
  - **Application chart information**
- **Mid-50's John Deere provided lists of plugs for**
  - **Heavy Service (plowing, threshing, hot weather, …)**
  - **Light Service (mostly what we do, cold weather, …)**
- **FSB-71 (3/37) admonished dealers to sell plugs via part number**
  - **Fouling plugs due to cheap plugs, improper shutter use**

Recommended plugs, continued

- **FSB-144 (4/43) – recognition of classes of use**
  - **Deere did not provide plugs for heavy and light service**
  - **“Purchase locally from a supply house”**
- **FSB-156 (10/46) assigned part numbers to three hot plugs**
- **Introduction of gasoline engines for A and B resulted in plug trouble**
  - **Started with Champion 6Com – a cold plug**
  - **Next came 8Com – a hotter plug**
  - **Finally went to AC-88L – a plug so hot Champion did not have a comparable one until 12-52 when the Champion 10Com-64 became available**

Recommended plugs, continued

- **FSB-205 (7/53) includes Table listing Champion and AC plugs for Light, Normal, and Heavy Service**
- **Updated in FSB-223 (11/54) and FSB-258 (10/57) (in handout)**
- **Important for our use to get proper heat range plugs**

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Plug Usage Issues

- **Plug Selection**
- **Cleaning & Installation**
- **Coil connection with distributor ignition**
- **Plug wires / Spark intensifiers**

Issues: Plug Selection

- **Decide if you want to use a NOS plug or a "modern" plug**
  - **NOS**
    - **NOS plugs are available for most applications**
    - **Handout lists several NOS plug suppliers**
    - **Prices are higher, plugs may have surface rust**
    - **Old NOS plugs were designed for tractor use**
    - **NOS AC, Auto-Lite and Champion plugs around**
    - **Edison-Splitdorf harder to find**
  - **Modern**
    - **AC, Autolite, Champion, Motorcraft, Bosch, NGK, Denso are primary present suppliers**
    - **Champion Master Catalogs are wealth of info**
      - **List many old plugs, conversions, heat range**

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Issues: Plug Selection, continued

- **Decide on brand of plug you want to use**
  - **AC, Autolite most in favor on Bulletin Boards**
  - **Champion less favored but has its supporters**
- **Use a heat range chart to locate the original equipment plug**
  - **Handout includes old chart**
  - **Spark plug catalogs have charts or tables**

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Issues: Plug Selection, continued

- **Decide on Service**
  - **Heavy – plowing, threshing in hot weather**
    - **Cold plug**
  - **Normal – what John Deere originally assumed**
    - **Mid-range plug**
  - **Light – parading, idling, light use, winter weather**
    - **Hot plug**
- **Using heat range chart, identify number of desired plug**
- **NAPA carries AC, Autolite, Bosch, Champion, NGK**

Issues: Cleaning and Installation

- **Study porcelain – if glazed try not to use abrasive cleaner**
- **Take-Apart plugs**
  - **Take plug apart – do not squeeze bushing in vice**
  - **Make sure internal gaskets are out – don't loose them**
  - **Soak in carburetor cleaner**
  - **Try to clean porcelain without use of abrasive blasting**
  - **Clean interior of shell and bushing as required**
  - **Assemble with gaskets in place**
  - **Tighten (about 30 ft-lbs)**
  - **Install new crush gasket**
  - **File end of conductor flat**
  - **File ground flat (if not a wire)**
  - **Set gap at 0.030 (if good mag 0.050 improves idle)**

Issues: Cleaning and Installation, continued

- One-piece plugs
  - Spray carburetor cleaner up around insulator
  - Try to get insulator clean and white
    - Hardest with hot plug
  - File end of conductor flat
  - File ground flat (if not a wire)
  - Set gap
- Installation
  - Clean around spark plug hole
  - Make sure new crush washers are on plug
  - Tighten plugs
    - 14mm – 30 ft-lbs 3/4 turn after finger tight
    - 18mm – 34 ft-lbs 1/2 to 3/4 " "
    - 7/8"-18 - 37 ft-lbs or 1/2 to 3/4 "

Issues: Coil connection with distributor ignition

- "Coil polarity" affects efficiency of spark plug
  - Want center electrode of plug to be "-"
  - Easy to make correct – by reversing wires to the coil
- Tests to tell if the coil is connected properly
  - Locate neon-bulb tester, note two electrodes in bulb
    - Connect between plug and ground
    - If electrode connected to plug glows, coil is correct
  - Take a wood "lead" pencil, sharpen end
    - Bring wire close to lead until spark jumps from wire to lead to plug terminal
    - Note flare of sparks – if flare is between pencil and plug, coil connection is correct

Issues: Coil connection, continued

- **Tests, continued**
  - **Obtain VOM with meter, 100,000 ohm resistor**
    - **With engine running connect (-) probe to one end of resistor, other end of resistor to plug terminal**
    - **Connect (+) probe to plug shell**
    - **If meter moves upscale, coil connection is correct**

Issues: Spark Plug Wires

- **Use only copper-core wires**
- **Graphite-core wires designed to reduce RF interference in automobile electronics**

Issues: Spark Plug Intensifiers

- Old concept – sold to “eliminate plug fouling”
- Rentz plug had adjustable gap
- Adds an additional gap in series with plug gap
- Required voltage to fire plug higher
- Champion UD-16/555

Modern Plugs

- Handout includes a listing of presently available versions of production plugs, as well as the hottest similar plug
  - Be careful with extended-nose plugs – measure!
- Present spark plug manufacturers include:
  - Champion – best catalog, includes tractors
  - AC-Delco – no listing for farm tractors(!)
  - Autolite – includes listing for tractors
  - NGK – includes tractor listing but limited plug options
  - Bosch
  - Denso
  - Stitt – old company, mainly oil-field engines
- Made in USA, Mexico and ??

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Summary

- History and technical details about plugs
- Suppliers of plugs to John Deere
- Plugs used by model and year in tractor production
- Plugs for special tractor use, and modern plug equivalents
- Proper plug usage
- Handout summarizes details

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