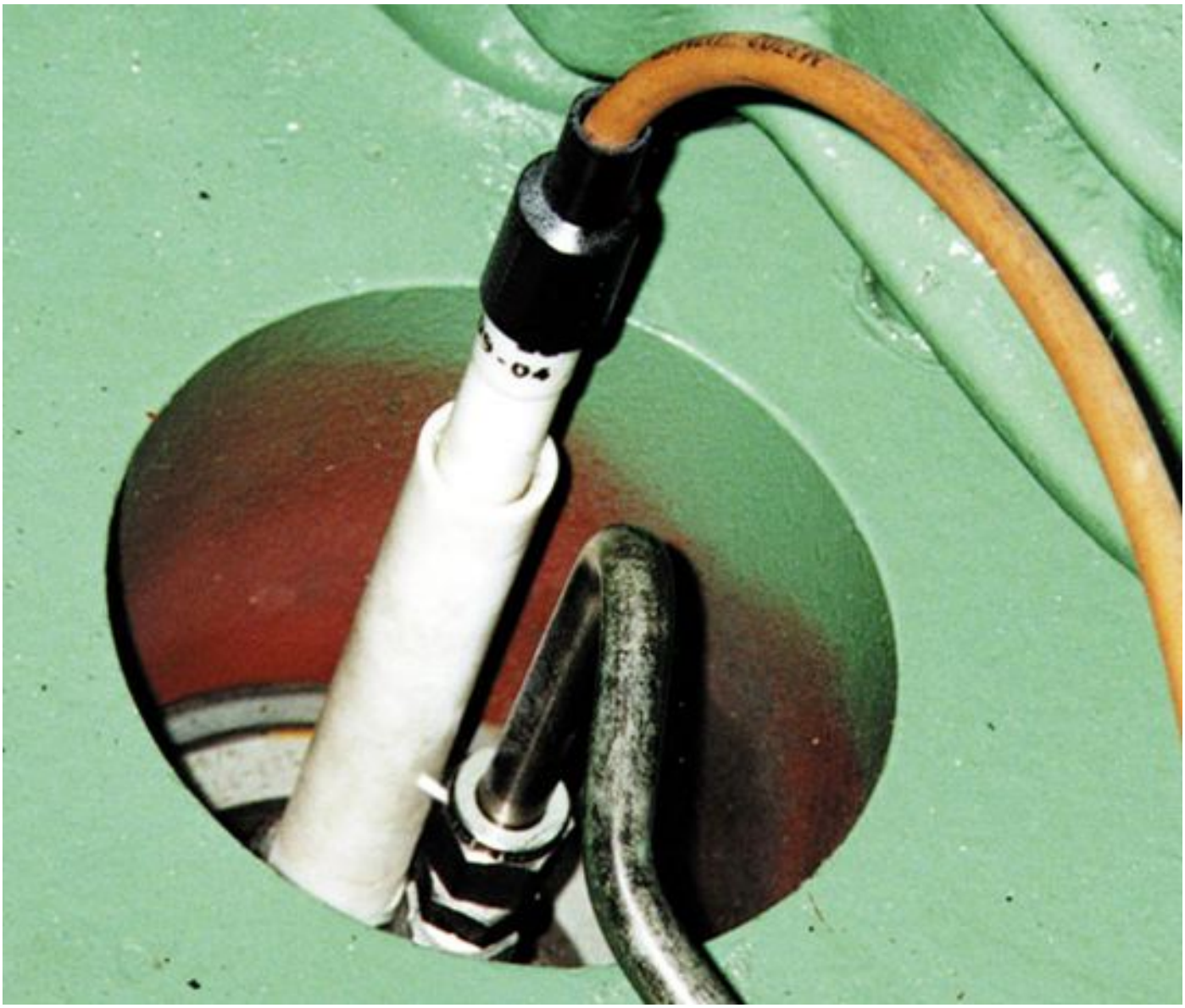
PLASTIC[PTFE] EXTENSIONS + SHORT SPARK PLUGS ARE MORE EXPENSIVE MORE TROUBLESOME MORE HAZARDOUS THAN STITT EXTENDED-BARREL SPARK PLUGS



One way of thinking has it that short, conventional spark plugs used with a plastic[PTFE, for example] extension+boot assembly is the most cost-effective way to configure the high-voltage side of the electrical ignition system.

But this conventional way of thinking is mostly mistaken. Let us consider the ways in which it is mistaken.

For purposes of illustration, we are going to use high voltage, ignition components that would be suitable for operation in a Worthington SUTC integral compressor engine.

FIRST, LET US CONSIDER SOME COMPONENT COSTS.

In the interest of safety, for operation in an engine in a Class 1, Group D, Division 2 hazardous [classified] location, we prefer to recommend that a spark plug design be used that provides for more of a restraint of the insulator than just a crimp [rollover] methodology.

We recommend this so as to insure that the ceramic spark plug insulator cannot blow-out [i.e., cannot

become a lethal projectile].

Additionally, for the two spark plug per cylinder applications, the SAFETY-RESTRAINT designs prevent a plume of flame exiting through the spark plug shell after an insulator assembly goes ballistic from one spark plug, but the second spark plug continues to furnish in-cylinder ignition.

We identify these short spark plug designs of ours as SAFETY-RESTRAINT designs and we consider this additional method of insulator retention as mandatory for operation in the Class 1, Group D, Division 2 classified engine facility.

And we are not unique in this point of view. All integral compressor engine manufacturers have recommended SAFETY-RESTRAINT design spark plugs for their elevated BMEP engine models. We manufacture a full range of such spark plugs[from short and relatively conventional in appearance to the various EXTENDED-BARREL variants].

For illustration, using the short, more conventional appearing, STITT SAFETY-RESTRAINT spark plugs combined with a plastic [polytetrafluoroethylene] extension, here are the approximate list price costs of these components [as of April 2005]....

STITT R107 = $36.67

BG 21735-26 = $46.39

Approximate List Price Cost $83.00

You can do the math. At the list price level, these components will cost the engine operator $83.06.

For the dual ignition SUTC, the list price will be $166.12 per cylinder.

Now, contrast this with the list price costs of the STITT EXTENDED-BARREL, SAFETY-RESTRAINT spark plugs.

For this SUTC engine, we recommend the....

S-R107B28-2 = $36.67

Take Note, *this extended-barrel, SAFETY-RESTRAINT spark plug is priced at a level no higher than the short SAFETY-RESTRAINT spark plug.*

Approximate List Price Cost $36.00

Sort of startling isn't it?

You can configure this SUTC engine the more old-fashioned, conventional way and, at list price levels, spend $166.12 per cylinder.

Or, you can do it the STITT EXTENDED-BARREL spark plug way and only spend $73.34 per cylinder.

At normal price levels, in this instance of the SUTC, the STITT EXTENDED-BARREL spark plug offers the engine operator virtually a $100 per cylinder ignition component cost savings.

Why is it that so many engine operators fail to understand component acquisition costs?

SECOND, LET US CONSIDER THE COSTS OF OPERATION.

We invite you to examine the photos. Do you see how the plastic extensions fail to prevent the contamination of the flashover portion of the spark plug insulator with conductive lube oil?

What you see here occurred within only a few hundred hours. The spark plugs have been so contaminated, have arced[flashed-over]-over so frequently that they are totally unsuitable for continuing use. They must be replaced.

Examine the plastic spark plug boot. Do you notice how it has been contaminated by this lube oil? This cooked lube oil is conductive. Being conductive, this cooked lube oil renders this boot[this extension] unsuitable for any re-use with a new spark plug. Principally because it will forever shunt[promote skin-tracking] the ignition voltage down the I.D. of this boot rather than conduct it to the central electrical path of the spark plug.

Consider, within only a few hundred hours, this plastic extension is no longer suitable for re-use and must be replaced. Principally because it is a promoter of misfiring. This inherent design deficiency imposes an extra maintenance expense upon the engine operator.

Plastic Extensions Fitted As Original Equipment By Dresser-Rand. After Less Than 1,500 Hours Of Operation

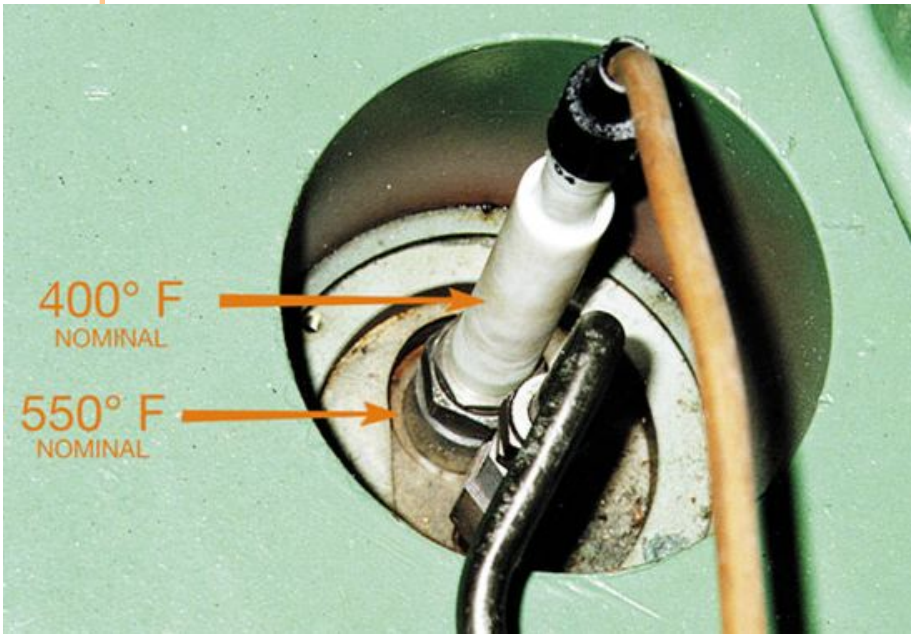
Contrast this with the usage of STITT EXTENDED-BARREL spark plugs, which eliminate the need for plastic extensions.

Under normal circumstances, conductive materials cannot contaminate the high-voltage circuit that is confined within the steel barrel of the STITT EXTENDED-BARREL spark plugs. The design of these STITT EXTENDED-BARREL spark plugs isolates the high-voltage circuit within the spark plug well completely.

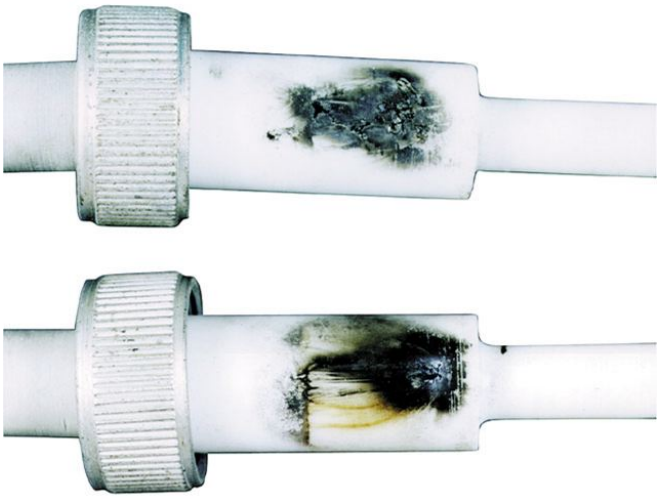
Even more importantly, outfitting the engine with STITT EXTENDED-BARREL spark plugs prevents the common mistake of re-using a plastic extension that is unsuitable for reuse either because of the accumulation of conductive contaminants or because of dielectric puncturing

Configuring the engine with the STITT EXTENDED-BARREL spark plugs insures the engine operator that with every spark plug change, everything is new, fresh, and factory-warranted.

Think about that when you consider doing it the way the engine manufacturer and conventional wisdom dictates that you do it.



All things considered, the STITT EXTENDED-BARREL spark plug configuration is the most cost-effective way to outfit an engine for the lowest maintenance costs over the long-term.



Teflon ® Coil Termination Components For Altronic 291001S Ignition Coils

THIRD, THE STITT EXTENDED-BARREL SPARK PLUGS ELIMINATE THERMALLY COMPROMISED PLASTIC INSULATION.

Plastic insulation is a big problem when it is used within a Class 1, Group D, Division 2 hazardous location.

What is the problem? Plastic does not retain its original dielectric [high-voltage insulating] properties when it is exposed to certain temperature levels. And this deterioration occurs rapidly.

And that is why Underwriters' Laboratories established a temperature index for polymeric materials[UL 746A,B,C].

Recognizing those ANSI [American National Standards Institute] standard documents, one should recognize that virtually all plastic materials [TEFLON®, for example] are inadequate for the requirements of long-term, safe operation within the thermal envelope of the stationary, electrical ignition, internal combustion engine.

This temperature index for polymeric materials is not new. It has been around for decades. And it is why STITT uses ceramic materials for its critical insulators. And why STITT shrouds this ceramic insulation within steel.

We do not think that any high voltage circuit in a hazardous location should ever allow for an electrical arc to be exposed to an externally combustible atmosphere.

As long as plastics are used as a high voltage insulator, then dielectric puncturing will be occurring.... and potentially combustible atmospheres will be exposed to ignition levels of electrical energy. Summarizing, let us recapitulate the advantages to the engine operator of the STITT EXTENDED-BARREL spark plugs.

1. LOWER ACQUISITION COSTS

2. LOWER MAINTENANCE COSTS

3. SAFETY. MORE CERTAIN SAFETY.

Concluding, we invite you to consider these engineering realities. If you have any questions, please feel free to communicate with us at your convenience.

If you have any interest in improving the safety of your internal combustion engine operations, please feel free to communicate with us at your convenience. For a more detailed discussion of these issues, we recommend that you read our PROFESSIONAL SPARK PLUG INSTALLATION MANUAL FOR INTEGRAL COMPRESSOR ENGINES. PSIM/899.

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