

# INTERNATIONAL STANDARD



# 3896

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION • МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ • ORGANISATION INTERNATIONALE DE NORMALISATION

## Road vehicles — Screened and waterproof spark plug and its connection — Type 3

*Véhicules routiers — Bougie d'allumage blindée et étanche et sa connexion — Type 3*

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**Descriptors** : road vehicles, ignition systems, spark plugs, specifications, waterproofing, sealing, screening, dimensions.

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## FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO Member Bodies). The work of developing International Standards is carried out through ISO Technical Committees. Every Member Body interested in a subject for which a Technical Committee has been set up has the right to be represented on that Committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the Technical Committees are circulated to the Member Bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 3896 was drawn up by Technical Committee ISO/TC 22, *Road vehicles*, and was circulated to the Member Bodies in June 1975.

It has been approved by the Member Bodies of the following countries :

|                |         |                |
|----------------|---------|----------------|
| Australia      | Germany | Sweden         |
| Austria        | Hungary | Switzerland    |
| Belgium        | Iran    | Turkey         |
| Chile          | Italy   | United Kingdom |
| Czechoslovakia | Mexico  | Yugoslavia     |
| Finland        | Romania |                |
| France         | Spain   |                |

The Member Body of the following country expressed disapproval of the document on technical grounds :

U.S.A.

# Road vehicles — Screened and waterproof spark plug and its connection — Type 3

## 1 SCOPE

This International Standard specifies the essential dimensional characteristics of a spark plug type used with spark ignition engines.

## 2 FIELD OF APPLICATION

The provisions of this International Standard apply to screened and waterproof spark plugs and their connections, type 3.

## 3 REFERENCES

ISO 68, *ISO general purpose screw threads — Basic profile.*

ISO 261, *ISO general purpose metric screw threads — General plan.*

ISO 965/I, *ISO general purpose metric screw threads — Tolerances — Principles and basic data.*

ISO 965/III, *ISO general purpose metric screw threads — Tolerances — Deviations for constructional threads.*

ISO 3412, *Road vehicles — Screened and waterproof spark plug and its connection — Type 1.*

ISO 3895, *Road vehicles — Screened and waterproof spark plug and its connection — Type 2.*

## 4 REQUIRED CHARACTERISTICS FOR THE SPARK PLUG AND THE HOUSING IN THE CYLINDER HEAD

### 4.1 Dimensions and thread (see figure)

#### 4.1.1 Plug reach and other dimensions

Dimensions in millimetres

| A                | M18 × 1,5   | 7/8"-18     |
|------------------|-------------|-------------|
| B                | 20,3 ± 0,2  | 15,9 ± 0,2  |
| C<br>(see 4.1.2) | 2,0 to 2,3  | 1,1 to 1,7  |
| D                | 15,5 ± 0,25 | 19,8 ± 0,25 |
| E max.           | 24,7        | 28,4        |
| F min.           | 27          | 32          |
| G min.           | 36          | 40          |
| H max.           | 35          | 39          |

#### 4.1.2 Gasket

When the spark plugs have been tightened with a torque of 48 N·m (threads clean, smooth and dry), the gasket thickness shall correspond to dimension C in the table in 4.1.1. If the gaskets are of a different thickness, a corresponding adjustment to dimension B shall be made.

4.1.3 Threads

4.1.3.1 DIMENSION LIMITS OF THE M18 X 1,5 THREAD

Dimensions in millimetres

| Dimension      |      | Plug thread<br>(on finished plug)<br>6e | Tapped hole in<br>cylinder head<br>6H |
|----------------|------|-----------------------------------------|---------------------------------------|
| Major diameter | max. | 17,933                                  | not specified                         |
|                | min. | 17,697                                  | 18,000                                |
| Pitch diameter | max. | 16,959                                  | 17,216                                |
|                | min. | 16,819                                  | 17,026                                |
| Minor diameter | max. | 16,092                                  | 16,676                                |
|                | min. | 15,845*                                 | 16,376                                |

\* With a root radius ≥ 0,150 mm (0,1 P).

4.1.3.2 TOLERANCE CLASSES OF THE M18 X 1,5 THREAD

The tolerance classes of thread M18 x 1,5 of finished spark plugs and of the corresponding tapped holes in the cylinder head are as follows :

- 6e for spark plugs (see note 2);
- 6H for tapped holes in the cylinder head.

NOTES

1 The threads M18 X 1,5 of the spark plugs and the corresponding tapped holes in the cylinder head shall comply with ISO 68, ISO 261, ISO 965/I and ISO 965/III.

2 In order that the spark plugs complying with this International Standard can be fitted in existing cylinder heads also in limiting cases, the value for the *upper limiting profile* of the minor diameter of the spark plug base has been slightly reduced with respect to the ISO value.

This maximum value of the minor diameter was calculated from a distance of H/6 for the *upper limiting profile* instead of 3H/16 given in figure 6 of ISO 965/I, clause 10, according to the formula given below :

Minor diameter max. =  $d_1 - e_s - 2(H/4 - H/6)$   
= 16,376 - 0,067 - 0,217  
= 16,376 - 0,284<sup>1)</sup> = 16,092

The value for the *basic profile* remains the same as for the ISO thread (16,376 - 0,067 = 16,309).

1) This value for the minor diameter is given in ISO 965/III.

3 The initial clearance  $e = 0,067$  mm between the pitch diameters of the thread and of the tapped hole is intended to prevent the possibility of seizure, as a result of combustion deposits on the bare threads, when removing the spark plugs.

This clearance is also intended to enable spark plugs with threads in accordance with this International Standard to be fitted in existing tapped holes.

4.1.3.3 DIMENSION LIMITS OF THE 7/8"-18 THREAD

Dimensions in millimetres

| Dimension      |      | Plug thread<br>(on finished plug) | Tapped hole in<br>cylinder head |
|----------------|------|-----------------------------------|---------------------------------|
| Major diameter | max. | 22,225                            | not specified                   |
|                | min. | 22,017                            | 22,225                          |
| Pitch diameter | max. | 21,295                            | 21,412                          |
|                | min. | 21,191                            | 21,308                          |
| Minor diameter | max. | 20,493                            | 20,851                          |
|                | min. | not specified                     | 20,698                          |

4.2 Other dimensions of the spark plug and the housing in the cylinder head

The other dimensions are indicated on the figure.

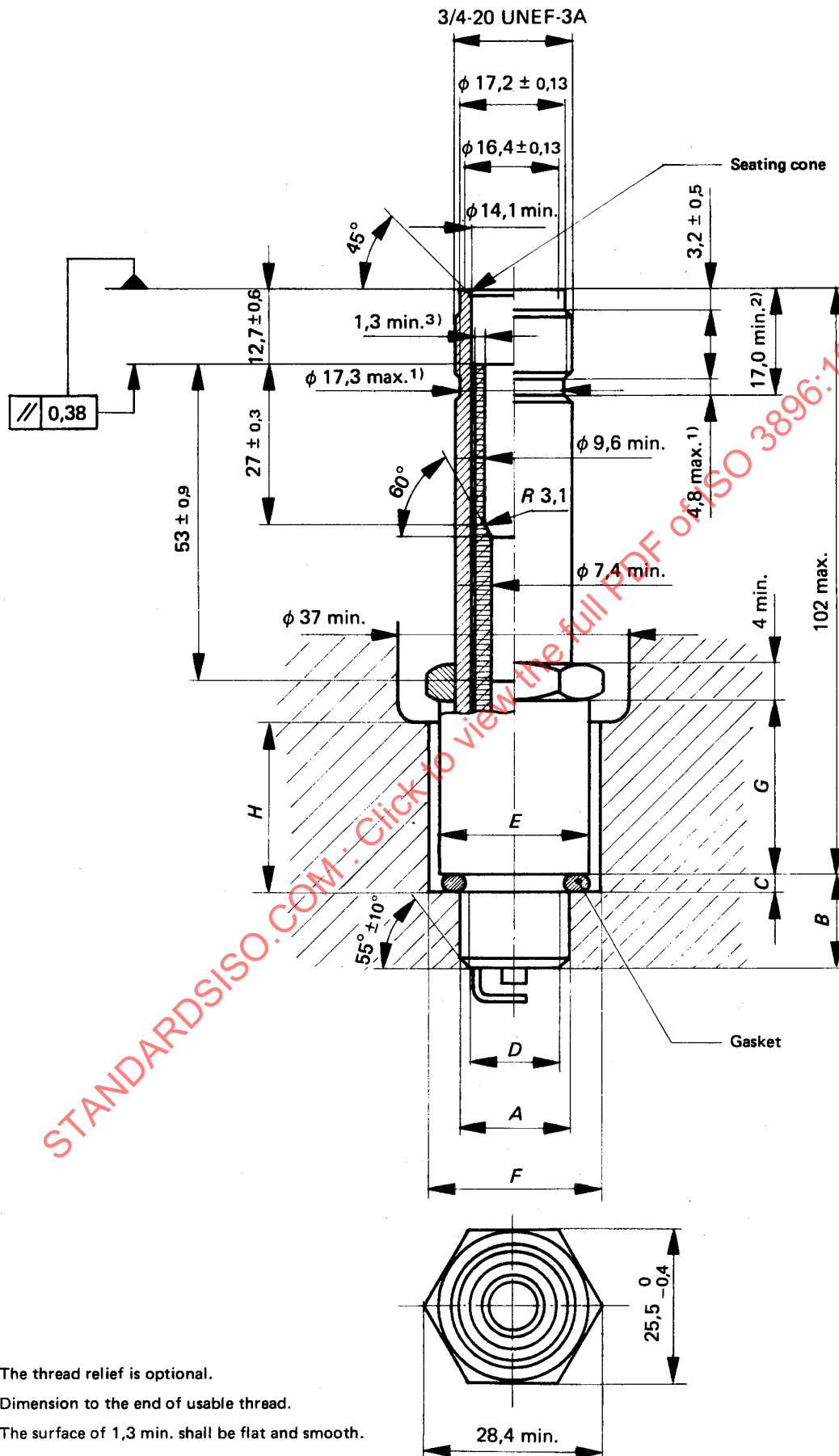
Details not specified are left to the manufacturer's choice.

5 REQUIRED CHARACTERISTICS FOR THE CONNECTION

The connector of this spark plug shall have a 3/4-20 UNEF-3B thread and a hexagon size of  $22,2 - 0_{0,4}^0$  mm with a width across corners of 24,6 mm min.

Moreover, the connector fitted to the spark plug must provide good watertightness, good electrical contact and a good screening to the radio-electric radiation.

Dimensions in millimetres



- 1) The thread relief is optional.
- 2) Dimension to the end of usable thread.
- 3) The surface of 1,3 min. shall be flat and smooth.

FIGURE — Screened and waterproof spark plug, type 3

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