Zagreb, 18/11/2019.

Project No. :	KK.01.2.1.01.0045
Number from the plan of the procurement:	22

TENDER DOCUMENTATION (TD)

Call for bids for hybrid powertrain components

No. 22 of procurement KK.01.2.1.01.0045

1. INFORMATION ON THE CLIENT

Name of the customer: DOK-ING d.o.o.
Address: Kanalski put 1, 10 000 Zagreb, Croatia
PIN: 39982657045
Internet address: http://www.dok-ing.hr/
E-mail: eunabava@dok-ing.hr
Telephone: +385 1 2481-300
Fax: +385 1 2481-303

2. INFORMATION ON THE CONTACT PERSON FOR COMMUNICATION WITH THE SUPPLIERS

Communication and any other exchange of information between the Customer and the Bidder shall be effected exclusively via e-mail. All questions and clarification requests can be sent via e-mail to: eunabava@dok-ing.hr

The Customer shall respond to the request for additional information and clarifications only if sent by e-mail to the above address. For the purpose of equal treatment of all bidders, the response to the requests shall be sent to all bidders regardless of who sent the initial application or question.

3. COMMENCEMENT OF THE PUBLIC PROCUREMENT PROCEDURE

The date of commencement of the public tender procedure is the date of publication of the Contract Notice on the website www.strukturnifondovi.hr

4. TYPE OF PROCUREMENT PROCEDURE

An open public procurement procedure with a public Procurement Notice is applied.

5. DESCRIPTION OF PROCUREMENT SUBJECT

The Customer is procuring a hybrid powertrain components. The equipment offered must comply with the technical specifications set out in Item 6.

All bidders shall respect the technical specifications referred to in Item 6 of the Procurement Documents. The procurement is not divided into groups and all bidders must submit one bid for all components. The submitted bid must include the total prices and separate prices for each of the offered components.

List of components:

1. **Generator (Electric motor), 1 pc.**
    a. **BorgWarner HVH410-075 DOM or „Equivalent“**
2. **Traction electric motors, 2 pcs.**
    a. **BorgWarner HVH250-115 SOM or „Equivalent“**
3. **Traction motors inverter (Double configuration), 1 pc.**
    a. **JohnDeere PD400 Dual or „Equivalent“**
4. **Generator inverter, 1pc.**
    a. **JohnDeere PD400 Single or „Equivalent“**
5. **Generator/ inverter (AC/DC) power supply cabling**
6. **Traction electric motors/ inverter (AC/DC) power supply cabling**
7. **Cable 95 mm^2, 10 m**
    a. **Coroplast FHLR2GCB2G or „Equivalent“**
8. **Cable 75 mm^2, 20 m**
    a. **Coroplast FHLR2GCB2G or „Equivalent“**
9. **Cable 50 mm^2, 30 m**
    a. **Coroplast FHLR2GCB2G or „Equivalent“**
10. **Cable 35 mm^2, 30 m**
    a. **Coroplast FHLR2GCB2G or „Equivalent“**
11. **Generator/Inverter one-time characterisation**
12. **Traction electric motors /Inverter one-time characterisation**
13. **Commissioning Support min. 40h**

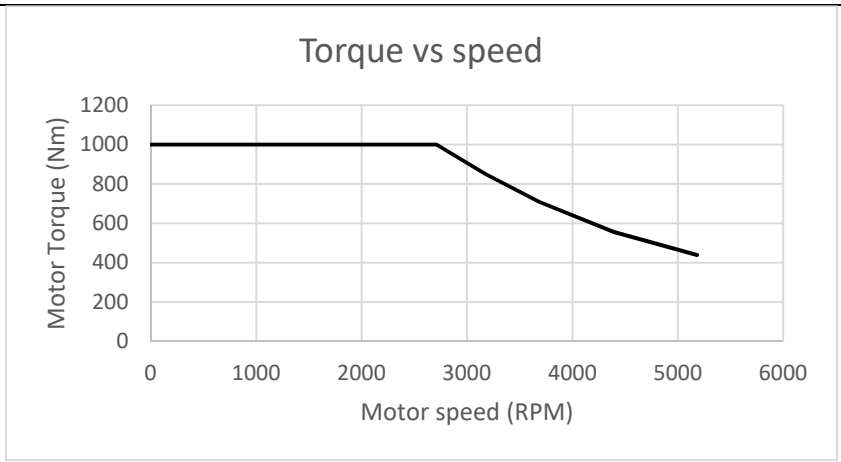
Call for project proposals is published in Croatian and English, and in accordance with the above-mentioned, technical specifications shall be in Croatian and English for the purpose of achieving equal treatment of all potential bidders and a clear understanding of all points of the technical specifications.

6. TECHNICAL SPECIFICATIONS

The supplier is expected to complete and deliver the following:
- hybrid powertrain components

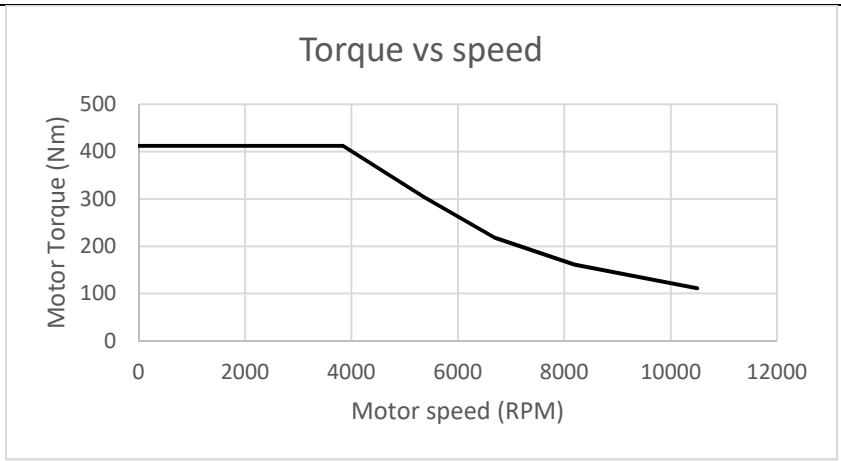
- Generator with power and signal cabling 1 pc
- Generator inverter with power and signal cabling 1 pc
- Traction Motors with power and signal cabling 2 pc
- Traction inverter with power and signal cabling 1 pc
- Auxiliary cables of 35, 50, 70 and 95 mm2 cross section
- 3D model of the motor and inverter components
- User manual for all of the components (if applicable)
- Installation manual for all of the components (if applicable)
- Commissioning support for motors and inverters
- Characterization data for motors and inverters

a. Generator (Electric motor), 1 pc.

Type	Permanent magnet synchronous motor
Rotor configuration	Inrunner
Min. torque vs speed characteristics @700VDC	
Current form	AC
Min. DC BUS voltage	≤ 700 V
Max. Current	≤ 600 Arms
Feedback sensor	Integrated resolver
Cooling	Oil cooled
Maximum dimension	max. length 210 mm (Without shaft), max. diameter 500 mm (Without connection box)

Max. weight:	105 kg
Max. Rotational Inertia	0,65 Kg m^2
Ambient temp. range	-40 to 140 °C
Operating temperature	≥ 175 °C
Mounting standard	SAE 2
Spline	ANSI B92.1 1996, z=38, alpha =37,5°, m=0,05 inch
IP protection	Min. IP67

b. Traction electric motors, 2 pcs..

Type	Permanent magnet synchronous motor
Rotor configuration	Inrunner
Min. torque vs speed characteristics @700VDC	
Current form	AC
Min. DC BUS voltage	≤ 700 V
Max. Current	≤ 600 Arms
Feedback sensor	Integrated resolver
Cooling	Oil cooled
Maximum dimension	max. length 310 mm (Without shaft), max. diameter 320 mm (Without connection box)
Max. weight:	60 kg
Max. Rotational Inertia	0,09 Kg m2
Ambient temp. range	-40 to 140 °C
Operating temperature	≥ 175 °C
Mounting standard	IEC 72
Spline	ANSI B92.2M 1980, z=24, alpha =30°, m=1 mm
IP protection	Min. IP67

c. Traction motors inverter (Double configuration), 1 pc.

Number of outputs	2
Min. DC BUS voltage (without derating)	≤ 300 V
Max. DC Bus voltage (without derating)	≥ 750 V
Max DC Bus voltage (with derating)	≥ 800 V
Continuous output Current	≥ 350 Arms (per output)
Peak output current	≥ 500 Arms (per output)
Cooling	Water or Water-Glycol cooled
Maximum dimension	max. length 480 mm, max. width 340 mm, max height 190 mm
Max. weight:	32 kg
Ambient temp. range	-40 to 70 °C
Coolant temperature range	-40 to 70 °C
Communication interface	2x CAN
Switching frequency	≥ 4 kHz
IP protection	Min. IP66
Control algorithm	Field-oriented control (FOC)
Motor type	Permanent-magnet synchronous

d. Generator inverter, 1pc.

Number of outputs	1
Min. DC BUS voltage (without derating)	≤ 300 V
Max. DC Bus voltage (without derating)	≥ 750 V
Max DC Bus voltage (with derating)	≥ 800 V
Continuous output Current	≥ 350 Arms (per output)
Peak output current	≥ 400 Arms (per output)
Cooling	Water or Water-Glycol cooled
Maximum dimension	max. length 400 mm, max. width 330 mm, max height 130 mm
Max. weight:	22 kg
Ambient temp. range	-40 to 70 °C
Coolant temperature range	-40 to 70 °C
Communication interface	2x CAN
Switching frequency	≥ 4 kHz
IP protection	Min. IP66
Control algorithm	Field-oriented control (FOC)
Motor type	Permanent-magnet synchronous

e. Cable 95 mm², 10 m.

Conductor material	Copper
Conductor cross section	95 mm2 ± 5 %
Cable outer diameter	≤ 21mm
Cable layout	According to figure 1.
Operating temperature range	-40 to 180 °C
Maximum DC voltage	≥ 1000 V
Current capacity @ 20 °C	≥ 500 A
Cable external color	Orange

f. Cable 70 mm², 20 m.

Conductor material	Copper
Conductor cross section	70 mm2 ± 5 %
Cable outer diameter	≤ 19mm
Cable layout	According to figure 1.
Operating temperature range	-40 to 180 °C
Maximum DC voltage	≥ 1000 V
Current capacity @ 20 °C	≥ 400 A
Cable external color	Orange

g. Cable 50 mm², 30 m.

Conductor material	Copper
Conductor cross section	50 mm2 ± 5 %
Cable outer diameter	≤ 16mm
Cable layout	According to figure 1.
Operating temperature range	-40 to 180 °C
Maximum DC voltage	≥ 1000 V
Current capacity @ 20 °C	≥ 350 A
Cable external color	Orange

h. Cable 35 mm², 30 m.

Conductor material	Copper
Conductor cross section	35 mm2 ± 5 %
Cable outer diameter	≤ 15mm
Cable layout	According to figure 1.
Operating temperature range	-40 to 180 °C
Maximum DC voltage	≥ 1000 V
Current capacity @ 20 °C	≥ 260 A
Cable external color	Orange

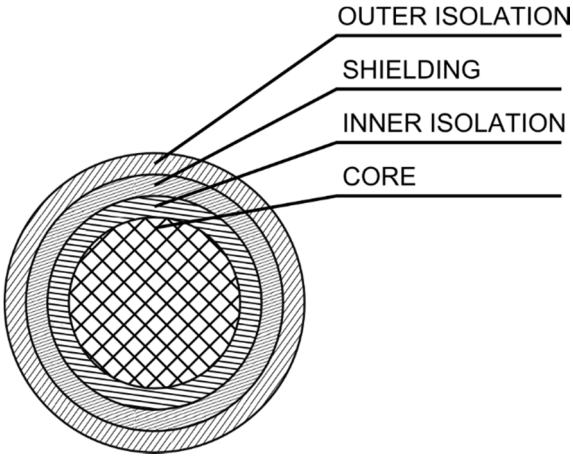


Figure 1. – Cable layout

7. EVALUATION CRITERION

The successful Bidder selection criteria shall be the most economically advantageous bid (best value for money).

Selection criteria for all the components:
- The procurement is not divided into groups and all bidders must submit one bid for all components, otherwise potential supplier will be directly excluded from the tender. Also all of the requirements regarding dimensions must be satisfied, otherwise the supplier is excluded from tender.

Evaluation criteria: Description	Score
Technical requirements within ± 5 % of components a - d (except weight)	60
Meeting the weight conditions of components a - d	10
Technical requirements within ± 5 % of components e - h	10
Price	20
Total	100

The calculation of the scores of the price is done according to the following formula:

- Xc = Cn / Cx X 20
- Xc – score number of the evaluated bid
- Cn – lowest tender price
- Cx – tender price

For the subject of the procurement, for all (sub)items/descriptions/referring to the place which may be affixed to a trademark, patent, type, norm or specific origin, the Bidder may offer "equivalent" to the requested or specified and Customer will accept other equivalent quality assurance measures, but in

that case the Bidder must enclose proof of equivalence (catalog, manufacturer or the like).
"Equivalent" is all off offered that is not within the prescribed description but meets the minimum technical characteristics of the required (sub)items. Where applicable, the characteristics must correspond to the defined ones, with the deviation up to +/- 1%, unless the range is otherwise defined by the Customer.

8. DELIVERY LOCATION

DOK-ING d.o.o., Kanalski put 1, 10000 Zagreb

9. PREPARATION AND SUBMISSION OF BIDS

The bid shall be submitted in Croatian (for Croatian bidder) or English (for non Croatian bidder) and in Latin script. When preparing the bid, the Bidder shall adhere to requests and requirements from the subject Tender Documents.
The bid must contain the following as a minimum:

1. Full name of Bidder, address and contact person
2. Detailed description of the equipment, according to the technical specifications referred to in Item 6. All points included in the technical specifications must be stated as indicated in Item 6.
3. Financial bid in HRK
4. Date and signature of the person authorized to represent the Bidder.

The proposal shall be submitted electronically, by e-mail to the address given in Item 1 of this call for bids.

10. DEADLINE FOR SUBMISSION OF BIDS

The deadline for submission of bids is 8 calendar days from the date of publication of this Notice at www.strukturnifondovi.hr

11. DELIVERY PERIOD OF THE PROCUREMENT SUBJECT

The delivery period shall commence immediately after signing the contract/ issuing the Purchase Order. The selected Bidder shall deliver and install the equipment and provide all of the services within the deadline of a maximum of 13 weeks from the date of Purchase Order / signing the contract.

12. MODIFICATION OR WITHDRAWAL OF SUBMITTED BIDS

The Bidder may change or withdraw their bid before the deadline for submission
If a modification or amendment to the bid is submitted, it must be submitted in the same way as the original proposal, indicating that this is a change / addendum to the proposal.

13. VALIDITY OF BIDS

The validity of bids must be at least 120 days after the deadline for submission.

14. SELECTION OF THE MOST ADVANTAGEOUS BID

The deadline for the evaluation of bids and the decision on a successful bidder is 10 working days after the deadline for submitting the proposal. The bidders shall be informed on the decision within that deadline.

Public procurement: Ivan Kralj