

Technical Assistance Agreement

This Technical Assistance Agreement ("Agreement" or "TAA") is made and entered into by the Contractual Parties ("Parties") on the later date of signature of both Parties.

1 Contractual Parties

Name:	Institute of Materials & Machine Mechanics, Slovak Academy of Science	Name:	Hyundai Motor Europe Technical Center GmbH
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Hereinafter:	Contractor or "IMSAS"	Hereinafter:	HMETC

2 Object of Agreement

2.1 The object of the Agreement is:

Aim of the project is the identification of the effect of aluminium foam use in engine/transmissions aluminium brackets on their NVH (noise dampening) properties. The brackets will be filled-in with aluminium foam inserts by 2 variations with different aluminium alloys. Alternatively also brackets fully made of reinforced aluminium foam will be manufactured and tested. Validations criterion will be the best noise dampening properties measured by IMSAS and HMETC VTD Department.

The aluminium foam parts are development of IMSAS Bratislava and will be delivered to HMETC filled into aluminium brackets and also in the shape of redesigned brackets for further testing and research. IMSAS will submit a report on the findings and results to HMETC which intends to use the knowledge and findings gained in the course of the proceedings for own developments and production in the future.

2.2 The Parties shall execute their respective duties in accordance with the Time Schedule set forth in Section 5. Each Party shall individually be responsible for executing its respective duties.

3 Performances of Contractor

3.1 Scope of Work

a) Shaped foam inserts:

Aluminium foam inserts manufactured by IMSAS from 2 different aluminium alloys will be filled into empty cavities of two different – left and right hand side -engine/transmissions brackets. The foam inserts will be fastened in original Al brackets by suitable (adhesive or another) bonding, which will be optimized to obtain best damping performance. Each bracket will be filled with foam inserts made of both aluminium alloys whereas each sample will be made twice for repeatability check. Totally 8 foam filled bracket samples will be manufactured and tested (2 alloys for foam inserts x 2 bracket variants x 2 samples of each)..

Damping performance will be tested at IMSAS, then technical report and all 8 samples will be delivered to HMETC for further evaluation. A detailed description of the work is given in the quotation 1300/01/2013 of IMSAS (Annex 1).

Contractor shall perform according to Annex 1 (quotation 1300/01/2013) and the provisions of this agreement the following works:

Production and delivery of shaped aluminium foam inserts:

- filling material AISi12 foam and aluminium composite foam
- foam porosity of all inserts will be ~80%
- the inserts will be foamed in suitable moulds according of CAD model of used brackets
- there are 2 bracket types, left and right hand side
- 4 moulds will be manufactured, one for each bracket cavity (each bracket has 2 cavities)
- 2 specimens for each bracket cavity and foam type, totally 16 Al foam inserts to be filled in totally 8 brackets
- the complex shaped brackets will be filled up to the lowest height of their outer rims.
- the foam inserts will be fastened in the brackets using suitable adhesives selected to maximise bracket damping capability
- damping properties will be evaluated using impact hammer test

b) Redesigned foam brackets:

The current aluminium brackets will be redesigned in the project with an aim to be manufactured fully from reinforced aluminium foam. Foam shape, alloy, porosity and reinforcement architecture will be designed to meet loading conditions described on HMC drawings & MS Specs using FEM analysis (ANSYS). The new design will be developed to minimize weight and maximize damping capability of foamed brackets. A detailed description of the work is given in the quotation 1300/01/2013 of IMMM SAS (Annex 1).

Contractor shall perform according to Annex 1 (quotation 1300/01/2013) and the provisions of this agreement the following works:

Production and delivery of redesigned aluminium foam brackets:

- brackets will be foamed in suitable moulds manufactured according developed design, 2 moulds will be prepared (for left & right side bracket)
- simple shaped stainless steel inserts will be used as aluminium foam reinforcement in locations where appropriate, shape and architecture of reinforcement will be designed according to FEM analysis
- the main mechanical and damping properties of developed brackets will be measured and evaluated, if necessary adaptation of reinforcement architecture will be made.
- technical report and 8 pcs redesigned brackets (4 left and 4 right side) made of reinforced aluminium foam will be finally delivered to HMETC for further evaluation

3.2 Contractor shall document the works performed hereunder and provide HMETC with a final report on the work results no later than at the end of the term or the effective date of termination of this TAA. The final report shall in particular and without being restricted to these contain the following:

- 8 (4 left and 4 right hand side) aluminium shaped foam filled brackets (containing totally 16 foam inserts) + 1 testing report
- 8 (4 left and 4 right hand side) redesigned brackets made of reinforced aluminium foam + 1 report containing results of FEM calculation and experimental evaluation of selected mechanical and damping properties

3.3 Deliveries of the shaped foam filled brackets and redesigned foam brackets shall be made to the premises of HMETC at the address indicated in section 1 above.

3.4 Furthermore, the place of performance shall be determined according to the applicable statutory provisions.

4 Provisions by HMETC

4.1 HMETC will provide Contractor with the following items:

- 8 empty aluminium brackets (4 right, 4 left)
- necessary consumable materials as previously agreed upon by the parties
- CAD model of brackets
- Information about loading and boundary conditions of assembled brackets

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- 4.2 Any items provided by HMETC hereunder shall be returned by Contractor at the end of the term or the effective date of termination of this TAA, or immediately upon HMETC's request.

5 Time Schedule

- 5.1 Contractor shall complete its performances in accordance with the following time schedule:

month	1	2	3	4	5
duration of the project from project start					
manufacturing of moulds for inserts					
foaming of inserts					
optimisation of bonding technique					
testing of damping properties					
testing report and delivery of foam filled brackets					
FEM analysis and redesign of brackets					
manufacturing of moulds for new brackets					
foaming of parts					
testing of damping and selected mechanical properties					
testing report and delivery of foam filled brackets					

- 5.2 The Project will be conducted in close cooperation with HMETC. In the course of the Project, results and processes of Project will be discussed in detail with HMETC and further project action agreed upon in writing.
- 5.3 Unless otherwise agreed upon between the parties, delays of IMSAS, either for which HMETC is solely responsible for (e.g. due to missing information) or because of circumstances, which are beyond the control of IMSAS, are excluded from IMSAS's liability set forth hereinafter. If there are some delays caused by IMSAS, IMSAS shall be liable according to the provisions of Section 8.5.
- 5.4 The Project work shall be started from the day after IMSAS received the items defined under Section 4.1 from HMRTC and the legal binding order of HMETC based on the quotation A 212 228 of IMSAS and this agreement.

6 Remuneration

- 6.1 Contractor shall complete its performances hereunder at an agreed price of

24.600,00 EUR

excluding the applicable value added tax, transport costs and costs incurred by Contractor. All payments are due 40 days after receipt of the invoice by HMETC from IMMM SAS. The parties agree to the following payment schedule:

- 1.) **13.200,00 €** after manufacturing and delivery of 16 shaped aluminium foam inserts, NVH results, 1st preliminary report
- 2.) **11.400,00 €** after manufacturing and delivery of 8 redesigned aluminium brackets, NVH results, 2nd preliminary report, final report

- 6.2 The parties will prepare and provide to the other party all required deliveries, test parts and attachments available under this agreement free of any charge unless otherwise agreed between the Parties. The required parts, if necessary, are detailed in a separate list. Not included in the above Project price are costs for accommodation and travel.

7 Term and Termination

This TAA shall become effective after signature of both parties and shall remain in force for 12 months unless terminated by a Party in accordance with the terms of this TAA or any applicable mandatory law on the termination for cause.

8 Warranty and Liability

- 8.1 IMSAS warrants that the project will be performed as it is intended and according to state of the art engineering skills. All work hereunder will be performed according to the specifications in Annex 1 and this agreement
- 8.2 IMSAS represents that it has experienced abundantly in the same or similar field as Project and it has many highly skilled engineers to perform Project.
- 8.3 Each party shall promptly advise the other of any significant error or improper information it may discover in the Project or technical information. In the event of IMSAS's solely intentionally or negligent fault, IMSAS shall, at its expense, correct the error in the Project or technical information and shall furnish the corrected information to HMETC without delay, if the implementation is not impossible.
- 8.4 HMETC is aware that in an individual case the research and development result may bear a risk of product liability. HMETC will take out reasonable insurance against such risk. Notwithstanding the foregoing, HMETC shall with respect to the delivered foamed or foam filled brackets indemnify IMSAS from any and all third-party claims based on product liability. Therefore, IMSAS shall keep all documents, data and materials in connection with Project for ten (10) years and supply HMETC with appropriate documents necessary to proceed Product Liability related action on the request of HMETC.
- 8.5 If HMETC suffers any damage or loss during the contract period and thereafter due to any intentionally or grossly negligent act or omission of IMSAS, IMSAS shall indemnify and hold HMETC harmless for such damage and loss. The liability of IMSAS for slight negligence shall be excluded.
- 8.6 With respect to the delivery of the foamed or foam filled brackets the claims of HMETC for breach of duty and tort shall be statute barred within 12 months after the delivery of the final report.

9 Third party intellectual property rights

IM SAS shall immediately notify HMETC of any conflicting third party industrial property rights of which it becomes aware during the performance of the contract. The contracting parties shall decide in joint consultation how such industrial property rights shall be taken into consideration in the further performance of the project. In the case of infringement of third party industrial property rights and/or if IMSAS has violated its obligation to notify HMETC as set forth above, IMSAS shall be liable under the provision of Section 8.5 in the sense that IMSAS will also be liable for slight negligence, but limited for slight negligence to the overall contract value set forth in Section 6.1. Clause 8.6 shall not apply in this case. HMETC shall have no further claims against IMMM SAS in case of infringement of third party intellectual property rights. IMMM SAS shall not be obliged to conduct any patent search in connection with this Agreement and the Project except if otherwise stipulated in writing between the parties.

10 Results / Intellectual property rights

- 10.1 Regarding the current Project both parties do have the joint understanding that – due to the kind of work to be performed according to Section 3 and Appendix 1 – there won't be any inventions or any other protectable results made neither by IMSAS in the course of this Agreement. Therefore the parties omit any contractual regulation with regard to the ownership, handling and use of project inventions and intellectual property rights to be filed for such inventions. In the

very improbable case that a protectable result will arise, the parties will inform each other immediately and shall find a fair and reasonable solution in this regard in a separate written agreement.

- 10.2 Each party may exploit (use and license) the results issued from the performance of this Agreement directly independently and for its own benefit and without any financial compensation to the other party, provided however that HMC(KMC)'s right to use and license according to this paragraph shall be limited to the damping properties of foamed or foam filled brackets as well as the test results provided to HMETC.
- 10.3 With respect to any pre-existing Know How and/or IP rights (e.g. patents or patentable solutions) of IMSAS included or involved in the deliveries under this agreement IMSAS grants to HMETC and HMC(KMC) a non-exclusive, irrevocable, perpetual, transferable and worldwide right for the purposes of further testing, development and evaluation, including the right to modify the deliveries for the aforesaid purposes. Any right to use any pre-existing Know How and/or IP rights (e.g. patents or patentable solutions) of IMSAS included or involved in the deliveries under this agreement for other purposes than those set forth above shall require a separate written agreement between the parties on fair and reasonable conditions.

11 Force Majeure

Neither Party shall be held responsible for failure or delay of performance wholly or in part of this Agreement due to flood, fire, earthquake, snowstorm, drought, hailstorm, hurricane, or any other events that are beyond the control of the effected Party and could not reasonably be expected at the time of conclusion of this Agreement or have been avoided or overcome by such Party. However, the Party whose performance is effected by the event of Force Majeure shall give a notice to the other Party of its occurrence as soon as possible and a certificate or a document of the occurrence of the Force Majeure event issued by the relative authority or a neutral independent third party shall be sent to the other Party not later than fourteen (14) days after its occurrence.

If the event of Force Majeure continues for more than thirty (30) days, both Parties shall settle the problem by friendly negotiations and reach a mutual conclusion.

12 Order of documents, Additional Terms and Conditions

- 12.1 The following documents shall apply as an integral part of the Agreement between the parties (in case of conflicts applying in the following order):

- this Agreement
- Annex 1: Quotation (Obligatory offer) 1300/01/2013

- 12.2 Any other provisions or terms and conditions shall not apply.

In the event of a conflict between the terms of an agreement and the terms of its attachment or schedule, the terms of the agreement shall prevail.

13 Confidentiality

The contracting parties shall for the duration of the contract and for a period of five years after its termination not make accessible to third parties information of a technical or commercial nature disclosed to each other and declared to be confidential. This shall not apply to information known or generally accessible to the other contracting party or to the public, or information which becomes known or generally accessible to the public after disclosure without any involvement or fault on the part of the other contracting party, or correspond to information disclosed or made accessible to the other contracting party by an entitled third party, or independently developed by an employee of the other contracting party not in possession of the information disclosed, or if there is a legal or official obligation to disclose it. In the event that a

party is legally required to disclose any information as stated in this Section, it will immediately notify the other party. Furthermore, that party shall only disclose such part of the information which it is legally obliged to disclose, and shall take all reasonable steps to obtain reliable assurance that the disclosed information shall be treated as confidential. The sending of unsecured emails between the contracting parties or their affiliates or within their respective groups of entities shall not be deemed a breach of the confidentiality obligation stated herein.

Third parties within the meaning of this provision shall not include subcontractors of the parties if these have been entrusted with a part of the services to be performed within the context of the assignment and if they have been placed under an obligation of confidentiality.

14 Termination of contract

- 14.1 Each contracting party shall be entitled to terminate the contract with immediate effect for good cause only.
- 14.2 Upon termination IMSAS shall submit within four weeks the result achieved until expiry of the period of notice. The HMETC shall be obliged to compensate IMSAS for costs incurred up to the expiry of the period of notice, where applicable. Personnel costs shall be reimbursed as incurred up to the date of termination. In the event that the termination is due to a fault by one of the contracting parties, this shall not affect damage compensation claims.

15 Miscellaneous

- 15.1 This Agreement shall be governed by and construed in accordance with the laws of the Federal Republic of Germany. The United Nations Convention on the International Sale of Goods (CISG) shall not apply.
- 15.2 Should one or more provisions of this Agreement be or become fully or partially void then the validity of the remaining provisions shall remain unaffected. The same shall apply in the case of a gap in the provisions.
- 15.3 Modifications and supplements of this Agreement as well as of agreements which are subject to or incorporate this Agreement are only effective if made in written form. This also applies to changes of this written form requirement. Furthermore, also any termination of an agreement which is subject to or incorporates this Agreement is required to be made in writing.
- 15.4 Place of jurisdiction for any disputes between Contractor and HMETC in connection with this Agreement and the agreements which are subject to or incorporate this Agreement shall be Frankfurt am Main.

For IMSAS:

Bratislava

Place

19.6.2013

Date

Ing. Karol IŽDINSKÝ, PhD.

Name (in block letters)

Signature

RD Contract/HYUNDAI_IMSAS final

For HMETC:

Rüsselsheim

Place

8.7.2013

Date

DR. VOLKER PRESCHER

Name (in block letters)

Signature

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