CETESB

COMPANHIA AMBIENTAL DO ESTADO DE SÃO PAULO

CONTRATO Nº 078838

CONTRATO DE FORNECIMENTO

Pelo presente instrumento e na melhor forma de direito, de um lado **CETESB - COMPANHIA AMBIENTAL DO ESTADO DE SÃO PAULO,** inscrita no C.N.P.J. sob nº. 43.776.491/0001-70, doravante denominada simplesmente CETESB com sede na Av. Prof. Frederico Hermann Jr., 345, e de outro lado **AVL SOUTH AMÉRICA LTDA.**, inscrita no C.N.P.J. sob nº. 03.883.390/0002-64, doravante denominada simplesmente CONTRATADA, com sede na Rua Antônio Utrilla, 315, Cidade Industrial Satélite – Guarulhos/SP, infra-assinado pelos seus respectivos representantes legais, têm entre si justo e acertado o seguinte:

CLÁUSULA 1ª - OBJETO E REGIME DE EXECUÇÃO

Constitui o objeto do presente Contrato, o **fornecimento e instalação de sistemas de amostragem e analisadores para ensaios de emissão veicular,** conforme proposta, Anexo 1, Termo de Referência, Anexo 2.

CLÁUSULA 2ª - PREÇO

A CONTRATADA obriga-se a fornecer o objeto deste Contrato, pelo preço à vista, no qual estão incluídos todos os custos diretos e indiretos, bem como os encargos, benefícios e despesas indiretas (BDI) e demais despesas de qualquer natureza.

Para fornecimento por importação direta pela CETESB:

Parágrafo único - O preço (CPT Incoterms 2020) é de **EURO 695.468,53 (seiscentos e noventa e cinco mil, quatrocentos e sessenta e oito euros e cinquenta e três centavos)** e o valor total estimado do contrato é de **R$ 4.900.000,00 (quatro milhões e noventos mil reais, base 1/08/2025**, conforme planilha que segue:

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COMPANHIA AMBIENTAL DO ESTADO DE SÃO PAULO

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CONVERSÃO DA MOEDA ESTRANGEIRA EM REAIS (R$)			
TAXAS	**%**	**MOEDA**	**R$**
Valor FCA		**€ 680.468,53**	**4.358.468,98**
Frete Internacional e despesas com documentação inclusos no valor FCA		**€ 15.000,00**	**96.076,50**
Subtotal (CPT)		**€ 695.468,53**	**4.454.545,48**
Imposto de Importação	**0%**	0,00	0,00
Subtotal		**€ 695.468,53**	**4.454.545,48**
IPI	**0%**	0,00	0,00
Subtotal		**€ 695.468,53**	**4.454.545,48**
PIS/PASEP	**0%**	0,00	0,00
Subtotal		**€ 695.468,53**	**4.454.545,48**
COFINS	**0%**	0,00	0,00
Subtotal		**€ 695.468,53**	**4.454.545,48**
ICMS	**0%**	0,00	0,00
Subtotal		**€ 695.468,53**	**4.454.545,48**
Outras Despesas	**10%**	**€ 69.546,85**	**445.454,55**
	Total	**€ 765.015,38**	**4.900.000,00**
Taxa de Câmbio	**R$**	**6,4051**	
Data da Cotação da Moeda		**1/08/2025**	

CLÁUSULA 3ª – CONDIÇÕES DE PAGAMENTO

O valor ofertado para importação direta pela CETESB será pago de acordo com as normas estabelecidas pelas autoridades monetárias brasileiras, por meio de carta de crédito à vista, a favor da representada da Contratada (AVL LIST GMBH), em banco do seu país, da seguinte forma:

a) para a abertura da carta de Crédito

a1) emissão pela representada da Contratada da Proforma Invoice com a descrição completa da(s) mercadoria(s), quantidades, pesos líquidos por item, preços unitários e valor total.

b) para a autorização do embarque

b1) emissão pela CETESB da Purchase Order em nome da Representada da Contratada (AVL LIST GMBH).

§ 1º A autorização do pagamento se dará mediante a apresentação pela representada da Contratada dos seguintes documentos de embarque ao banco pagador:

a1) comercial Invoice assinada, com a descrição completa da(s) mercadoria(s), quantidades, pesos líquidos por item, preços unitários e valor total;

a2) conhecimento de embarque consignado à ordem da CETESB

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CONTRATO Nº 078838

a3) lista de volumes (Packing List), identificando o conteúdo e a quantidade de itens em cada volume;

a4) certificados de Garantia (quando exigidos).

CLÁUSULA 4ª - PRAZO E LOCAL DE ENTREGA E INSTALAÇÃO

a) O prazo para o embarque é de até 396 (trezentos e noventa e seis) dias, contado da ordem de embarque, a ser formalizada pela CETESB, por meio de Purchase Order (PO) em nome da Representada da Contratada (AVL LIST GMBH).

b) Local de instalação: Setor de Laboratório de Emissão Veicular OTTO, localizado a Avenida Professor Frederico Hermann Jr., 345, Alto de Pinheiros, São Paulo, SP.

CLÁUSULA 5ª – RECEBIMENTO

O objeto contratado será recebido:

a) provisoriamente, mediante termo circunstanciado e assinado pelos representantes das partes, no ato da entrega do objeto e no qual se consignará o prazo de até 30 (trinta) dias destinados à instalação e testes de funcionamento;

b) definitivamente, mediante termo circunstanciado e assinado pelas partes, após a conclusão dos testes previstos na alínea anterior;

c) para os materiais oferecidos para importação direta pela CETESB, o prazo acima será contado a partir da data do desembaraço alfandegário.

d) aplica-se ao presente contrato, no que couber, a redação em vigor da Lei Federal 8.078/90.

CLÁUSULA 6ª - OBRIGAÇÕES E RESPONSABILIDADES DA CONTRATADA

Obriga-se a CONTRATADA, entre outras coisas, a:

a) fornecer o objeto desta contratação em estrita obediência ao Edital, especificações técnicas e proposta;

b) prestar todas as informações solicitadas pela CETESB desde que pertinentes a este contrato e respectivo objeto;

c) dar garantia total contra qualquer defeito de fabricação e funcionamento pelo prazo mínimo estabelecido na especificação técnica;

d) dar garantia do fornecimento de peças de reposição pelo prazo mínimo estabelecido na especificação técnica;

e) cumprir as disposições constantes do Código de Ética e Conduta da CETESB, disponível no site www.cetesb.sp.gov.br, sob pena das sanções previstas pelo seu descumprimento.

CLÁUSULA 7ª – PENALIDADES

Minuta do Contrato previamente aprovada pelo Departamento Jurídico da CETESB, conforme pág. 292 do processo.

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A inexecução total ou parcial do(s) contrato(s) ou cometimento de falhas de qualquer natureza que comprometam, em qualquer grau, o cumprimento das obrigações assumidas, garantida prévia defesa, sujeitará a contratada, sem prejuízo das sanções previstas em lei, às seguintes penalidades:

a) Advertência e/ou multa.

b) Suspensão temporária de participar em licitação e impedimento de contratar com a CETESB, pelo prazo de até 24 (vinte e quatro) meses.

c) Declaração de inidoneidade para licitar ou contratar, enquanto perdurarem os motivos determinantes da punição até que seja promovida sua reabilitação perante a CETESB.

§ 1º a pena de multa será assim aplicada:
I – de 30% do valor total corrigido da avença, no caso de inexecução total do contrato;
II – de 30% (trinta por cento) do valor corrigido da avença, relativo à parte da obrigação não cumprida, no caso de inexecução parcial do contrato;
III – de 1% (um por cento) do valor corrigido da avença, no caso de atraso injustificado na execução do contrato, acrescido de:
a) 0,2% (dois décimos por cento) ao dia, para atrasos de até 30 dias;
b) 0,4% (quatro décimos por cento) ao dia, para atrasos superiores a 30 dias, no que exceder ao prazo previsto na alínea “a” deste inciso.
§ 2º – Os percentuais de que tratam as alíneas “a” e “b”, do inciso III, deste artigo, incidirão sobre o valor total corrigido do contrato.
§ 3º – A reincidência no descumprimento do prazo de entrega ensejará a aplicação da multa em dobro.
§ 4º - O valor correspondente à multa aplicada poderá ser, a critério da CETESB, descontado dos pagamentos devidos em decorrência da execução do contrato que ensejou a sanção ou ser descontado de eventuais créditos a receber.
§ 5º – Inexistindo o desconto nos moldes previstos no § 3º, deste artigo, o correspondente valor deverá ser recolhido, através de guia apropriada, no prazo de 10 (dez) dias corridos contados da notificação.
§ 6º – O valor da penalidade ficará restrito a 30% (trinta por cento) do valor corrigido da avença.
§ 7º – A aplicação da penalidade de multa independe de prévia aplicação de penalidade de advertência.
§ 8º - O atraso injustificado superior a 60 (sessenta) dias corridos será considerado inexecução total, salvo razões de interesse público expostos em ato motivado da autoridade competente.
§ 9º - O não pagamento das multas no prazo e formas indicados, implicará no registro de devedor no Cadastro Informativo dos Créditos não Quitados de Órgãos e Entidades Estaduais – CADIN e na inscrição do débito na Dívida Ativa do Estado para cobrança judicial.
§ 10º - As penalidades previstas neste capítulo poderão ser aplicadas isolada ou cumulativamente, observadas as prescrições legais pertinentes e as disposições estabelecidas nos respectivos instrumentos convocatórios.
§ 11º - Independentemente das sanções estabelecidas nos incisos I e II, do parágrafo primeiro, a CONTRATADA, em razão se sua inadimplência, arcará ainda,

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a título de perdas e danos, com a correspondente diferença de preços verificada em nova contratação, se nenhum dos classificados remanescentes aceitar a contratação nos termos propostos pela inadimplente.

CLÁUSULA 8ª – RESCISÃO

A inexecução total ou parcial do Contrato enseja a sua rescisão, sem prejuízo das demais penalidades previstas neste Contrato.

§ 1º - O presente Contrato será rescindido:

a) se verificada a ocorrência de quaisquer das hipóteses elencadas no artigo 55, do Regulamento de Licitações da CETESB;

b) caso não seja cumprido ou o cumprimento irregular do Código de Conduta e Integridade da CETESB.

§ 2º - A rescisão será formalizada obedecendo-se as disposições previstas em Lei.

§ 3º - A rescisão de que trata esta Cláusula acarretará as consequências estabelecidas na Lei Federal 13.303/2016.

CLÁUSULA 9ª - VINCULAÇÃO AO EDITAL

O presente Contrato está vinculado ao Edital 8/2025/308 e reproduz os termos e condições da proposta vencedora.

CLÁUSULA 10 - OBRIGAÇÕES DA HABILITADA

A Contratada obriga-se a manter durante toda a execução do Contrato, compatibilidade com as obrigações por ela assumidas nas condições da habilitação e qualificação exigidas na licitação.

§ 1º - A CETESB poderá exigir, a qualquer momento, comprovação do cumprimento dessas obrigações, sob pena de rescisão contratual;

§ 2º - A Contratada obriga-se a cumprir as disposições constantes do Código de Ética e Conduta da CETESB, disponível no site www.cetesb.sp.gov.br, sob pena das sanções previstas pelo seu descumprimento.

CLÁUSULA 11 - LEGISLAÇÃO APLICÁVEL

Este contrato é regido pela Lei Federal nº 13.303/2016, pelo Regulamento Interno de Licitações da CETESB e subsidiariamente pela Lei Federal nº 14.133/2021 na utilização da modalidade PREGÃO na forma ELETRÔNICA, previsto no seu Artigo 28, Inciso I e demais legislação aplicáveis.

CLÁUSULA 12 - NOVAÇÃO

A tolerância das partes não implica em novação das obrigações assumidas neste Contrato.

CLÁUSULA 13 - RECURSOS ORÇAMENTÁRIOS

As despesas decorrentes correrão conta de recurso de investimentos da CETESB, natureza de despesa 44905234, conforme solicitação de compras 143744/ETTL.

CLÁUSULA 14 – ANEXOS

Minuta do Contrato previamente aprovada pelo Departamento Jurídico da CETESB, conforme pág. 292 do processo.

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COMPANHIA AMBIENTAL DO ESTADO DE SÃO PAULO

CONTRATO Nº 078838

Faz parte deste Contrato, o Anexo 2 (Termo de Referência) do Edital, bem como a proposta definitiva da proposta vencedora, naquilo que não colidir com as cláusulas e condições deste instrumento.

CLÁUSULA 15 - FORO

Fica eleito o Foro da Comarca da Capital, com renúncia expressa de qualquer outro, por mais privilegiado que seja ou venha a ser, para dirimir eventuais questões relativas a este Contrato.

E por se acharem justas e acordadas, as partes assinam perante as testemunhas abaixo, o presente Contrato em 02 (duas) vias, de igual teor e validade, para que produza os efeitos legais.

São Paulo, 12/09/2025.

CETESB – COMPANHIA AMBIENTAL DO ESTADO DE SÃO PAULO

Maria Helena R. de B. Martins
Diretora de Qualidade Ambiental

Thomaz Miazaki de Toledo
Diretor-Presidente

Alysson Gualberto Aniceto
Diretor Executivo
295.950.938-80

Testemunhas:

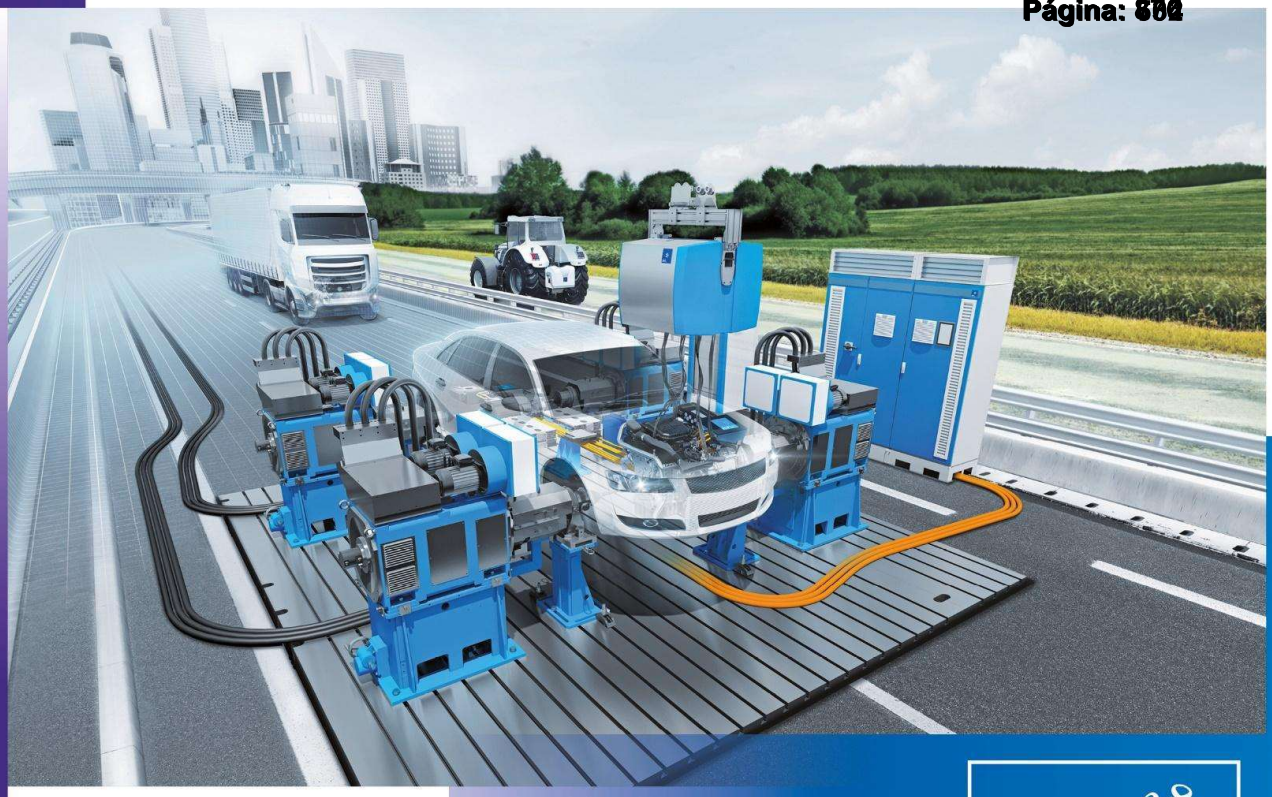
Cristina Andrade D'Amico
CPF: 170.761.818-60
RG: 22.141.485

Eduardo Alves Rodrigues
CPF: 198.468.038-26

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CETESB

COMPANHIA AMBIENTAL DO ESTADO DE SAO PAULO

SlimLine System w. PHEV/BEV Package

AVL Proposal: 0371081-16B

According to ETTL-004-25 Termo de Referencia vfinal

15. August 2025

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PROPOSAL PREPARED FOR

CETESB - COMPANHIA AMBIENTAL DO ESTADO DE SAO PAULO
AV. PROFESSOR FREDERICO HERMANN JR. 345
05459-900 SÃO PAULO SP

PROPOSAL PREPARED BY

Jorge Yonezawa
eMail: jorge.yonezawa@avl.com
Phone No.: +55 11 5536 3424
Mobile: +55 11997705653

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PRICING

Pos	Qty	Item Name		Price in BRL / Total Net
1	**1**	**AVL SLIMLINE SYSTEM** **T-00B.00**		
1.1	**1**	**AMA SL DILUTE - ANALYZER BENCH** T.00		
1.1.1	**1**	**AMA SL D1 EMISSION BENCH** TEEBBU.00		
		consisting of:		
1.1.1.1	1	AMA SL D1 BASIC UNIT		
1.1.1.2	1	AMA SL Dx SGU EXTENSION 3RD+MIDSPAN GAS		
1.1.1.3	1	AMA SL REDUCER PIECE 6MM - 4MM		
1.1.1.4	1	AMA SL UPS EXTENSION BOX FOR PC		
1.1.2	**1**	**AMA SL Dx ANALYZER EXTENSION** TEEBAK.00		
		consisting of:		
1.1.2.1	1	AMA SL UPGRADE TO TUNNEL TWIN FID		
1.1.2.2	1	AMA SL DIL. UPGRADE CLD NO & NOX CHANNEL		
1.1.2.3	1	AMA SL IRD CO2 L / CO L		
1.1.3	**1**	**DISCOUNT FOR USED SYSTEM - AMA SL D1 (GU0678)** TE6BSE.00		
		consisting of:		
1.1.3.1	1	DISCOUNT FOR USED SYSTEM - AMA SL D1		
1.2	**1**	**CVS SL - FULL FLOW DILUTION SYSTEM** T.00		
1.2.1	**1**	**CVS SL LD LE** TEECBU.00		
		consisting of:		
1.2.1.1	1	CVS SL LD LE BASIC UNIT W/O IPC		
1.2.1.2	1	CVS SL LE BAG EXTENSION 4/4/4		
1.2.1.3	1	CVS SL MFC BAG FILLING MONITORING		
1.2.1.4	1	CVS SL VENTURI 2M³/MIN		
1.2.1.5	1	CVS SL VENTURI 4M³/MIN		
1.2.1.6	1	CVS SL VENTURI 8 M3/MIN		
1.2.1.7	1	CVS SL VENTURI 16 M3/MIN		
1.2.1.8	1	CVS SL BLOWER 30M3		
1.2.1.9	1	CVS LD SILENCER FOR UP TO 40 M3/MIN		
1.2.1.10	1	CVS LD BLOWER SOUND PROTECTION HOOD		
1.2.2	**1**	**CVS SL CVS SL BLOWER EXTENSIONS**		
		consisting of:		
1.2.2.1	1	CVS SL BLOWER 30M3		
1.2.2.2	1	CVS LD SILENCER FOR UP TO 40 M3/MIN		
1.2.2.3	1	CVS LD BLOWER SOUND PROTECTION HOOD		
1.2.3	**1**	**CVS SL LD DILUTION AIR PREPARATION** TEECTO.00		

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Pos	Qty	Item Name		Price in BRL / Total Net
		consisting of:		
1.2.3.1	1	VTi 2-STAGE DILUTION AIR FILTER		
1.2.3.2	1	RMU/VTI ACTIVATED CHARCOAL FILTER		
1.2.3.3	1	CVS LD DILUTION AIR HEATER 18 KW		
1.2.3.4	1	TPC LD VTI MODULAR		
1.2.3.5	1	VTI200 CONN.TUBE AIR FILTER – TUNNEL		
1.2.4	**1**	**CVS SL LD TUNNEL & PIPING** TEECTO.00		
		consisting of:		
1.2.4.1	1	CVS LD EXHAUST PIPE ADAPTER		
1.2.4.2	1	HEATED FLEX. EXHAUST TUBE GTR15-3M		
1.2.4.3	1	VTi LD MIXING POINT FIX		
1.2.4.4	1	VTI200 DILUTION TUNNEL WO ELECTROPOLISH		
1.2.4.5	1	CVS TCU STAND-ALONE MODULE (PT100) 100-120V		
1.2.4.6	3	CVS PIPE UP TO 5M		
1.2.4.7	3	CVS PIPE INSULATION UP TO 5M		
1.2.4.8	1	DIL.EXHAUST RISER TUBE W/O ELECTROPOLISH		
1.2.4.9	1	90° ELBOW INLET TUBE W/O ELECTROPOLISH		
1.2.5	**1**	**DISCOUNT FOR USED SYSTEM - CVS SL (GU1207)** TE6BSE.00		
		consisting of:		
1.2.5.1	1	DISCOUNT FOR USED SYSTEM - CVS SL		
1.3	**1**	**PSS SL - PARTICLE SAMPLING** T.00		
1.3.1	**1**	**PSS SL SD** TEEPBU.00		
		consisting of:		
1.3.1.1	1	PSS SL SD BASIC UNIT W/O IPC		
1.3.1.2	4	PSS PART. FIL. HOLDER 1X47MM		
1.3.2	**1**	**DISCOUNT FOR USED SYSTEM - PSS SL (GU1208)** TE6BSE.00		
		consisting of:		
1.3.2.1	1	DISCOUNT FOR USED SYSTEM - PSS SL		
1.4	**1**	**NEW EQUIPMENT** T.00		
1.4.1	**1**	**NEW iGEM DEVICE SW PACKAGE** TEEBBU.00		
		consisting of:		
1.4.1.1	1	IGEM AMA MULTI CONFIGURATION AMA/CVS/PSS		
1.4.1.2	1	iGEM AMA 1066 AND EU 6 LD SW EXT.PACKAGE		
1.4.1.3	1	IGEM AMA QUALITY CENTER		
1.4.1.4	1	iGEM CVS 1066 AND EU 6 LD SW EXT.PACKAGE		
1.4.1.5	1	iGEM PSS 1066 AND EU 6 LD SW EXT.PACKAGE		

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Pos	Qty	Item Name		Price in BRL / Total Net
1.4.2	**1**	**NEW HARDWARE** TEECTO.00		
		consisting of:		
1.4.2.1	1	NEW INSTALLATION MATERIAL DILUTE		
1.4.2.2	1	RMU/VTi HEATING MIXING POINT		
1.4.2.3	1	PSS i60 FILTER HOLDER TRANSPORT BOX		
1.5	**1**	**ICAL CALIBRATION AND TEST EQUIPMENT** T.00		
1.5.1	**1**	**ICAL CALIBRATION AND TEST EQUIPMENT** TEEMC.00		
		consisting of:		
1.5.1.1	1	ICAL CFO i60 LE BASIC UNIT 100-120V		
1.5.1.2	1	ICAL GNU SL EXT. GDU / NGU 63 STEPS		
1.6	**1**	**AVL PROJECT EXECUTION SERVICES** T.00		
1.6.1	**1**	**AVL PROJECT MANAGEMENT & ENGINEERING** TEEBSE.00		
		consisting of:		
1.6.1.1	1	AVL PROJECT MANAGEMENT - CUSTOMER PROJECT (w. travel)		
1.6.1.2	1	AVL AAT PROJECT MANAGEMENT		
1.6.1.3	1	AVL AAT PROJECT ENGINEERING		
1.6.1.4	1	AVL DOCUMENTATION AND SOFTWARE CHANGE		
1.6.2	**1**	**DISASSEMBLING & PACKING SL DILUTE** TEEBSE.00		
		consisting of:		
1.6.2.1	1	AVL LABOR ON SITE - PRE-CHECK SL DILUTE		
1.6.2.2	1	AVL LABOR ON SITE - DISASSEMBLING SL DILUTE		
1.6.2.3	1	TRAVEL EXPENSES DISASSEMBLING DILUTE		
1.6.2.4	1	PACKING MATERIAL & SHIPPING		
1.6.3	**1**	**AVL DEVICE INSTALLATION** TEEBSE.00		
		consisting of:		
1.6.3.1	1	AMA SL INSTALLATION - 1 STREAM		
1.6.3.2	1	AMA SL COMM. & FAT - 1 STREAM - BASIC		
1.6.3.3	1	CVS SL INSTALLATION		
1.6.3.4	1	CVS SL COMMISSIONING & FAT - BASIC		
1.6.3.5	1	PSS SL INSTALLATION		
1.6.3.6	1	PSS SL COMM. & FAT		
1.6.3.7	1	VTi LD INSTALLATION		
1.6.3.8	1	TRAVEL EXPENSES INST. & COMM.		

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Pos	Qty	Item Name		Price in BRL / Total Net
2	**1**	**AVL EMISSION AUTOMATION SYSTEM** **T-00B.00**		
2.1	**1**	**iGEM 2 BASIC SOFTWARE & HARDWARE** T.00		
2.1.1	**1**	**IGEM 2 VEHICLE SOFTWARE LICENCES** TEMASX.00		
		consisting of:		
2.1.1.1	1	IGEM 2 FOR VEHICLE TESTING		
2.1.1.2	1	iGEM 2 DILUTE DEVICE CONTROL MODULE		
2.1.1.3	1	iGEM 2 CALIBRATION AND DEVICE CHECKS		
2.1.1.4	1	IGEM 2 DATA PROCESS. TOOLBOX TESTBED NL		
2.1.2	**1**	**AVL CONCERTO 5 EXTENSION** TOXCONCEN.00		
		consisting of:		
2.1.2.1	1	ASAM WRITE (COMPOSER) OPTION NL		
2.1.2.2	1	CONCERTO ADK LIZENZ NL		
2.1.3	**1**	**IGEM 2 VEHICLE HARDWARE (Typical)** TEMAHX.00		
		consisting of:		
2.1.3.1	1	iGEM 2 FOR VEHICLE TESTING BASE SYSTEM 20HU		
2.1.3.2	1	AVL TESTBED DRIVERS AID 12 HU TROLLEY		
2.1.3.3	1	AVL TESTBED DRIVERS AID REMOTE CONTROL		
2.1.3.4	2	IGEM 2 WEATHER STATION INDIGO 520		
2.1.3.5	1	AVL TESTBED OBD LINK HW		
2.1.4	**1**	**IGEM 2 REGUL. & TC PACK BRAZIL PROCONVE** TEMAOX.00		
		consisting of:		
2.1.4.1	1	IGEM 2 BRAZIL PROCONVE NBR6601_2021 NL		
2.1.4.2	1	IGEM 2 US 1066 NL		
2.1.4.3	1	IGEM 2 BRAZIL PROCONVE FTP75		
2.1.4.4	1	IGEM 2 BRAZIL PROCONVE HWFET		
2.1.4.5	1	IGEM 2 EPA US NYCC		
2.1.4.6	1	IGEM 2 US EVAPORATE PREPARATION CYCLES		
2.1.5	**1**	**AVL iGEM 2 PROJECT SERVICES** TEMAPX.00		
		consisting of:		
2.1.5.1	1	AVL PROJECT MANAGEMENT - CUSTOMER PROJECT		
2.1.5.2	1	iGEM 2 PROJECT MANAGEMENT		
2.1.5.3	1	iGEM 2 PROJECT ENGINEERING		
2.1.5.4	1	iGEM 2 INSTALLATION & COMMISSIONING		
2.1.5.5	1	iGEM 2 ACCEPTANCE		
2.1.5.6	1	TRAVEL EXPENSES INST. & COMM.		
2.1.6	**1**	**TRAINING FOR TESTBED AUTOMATION** TTAUTO.00		
		consisting of:		
2.1.6.1	1	TRAINING IGEM 2 VEHICLE		

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Pos	Qty	Item Name		Price in BRL / Total Net
2.1.6.2	1	TRAVEL EXPENSES TRAINING iGEM 2 ON-SITE		
2.2	**1**	**BEV/HEV/PHEV EXTENSION** T.00		
2.2.1	**1**	**BATTERY DEPLETING MEASUREMENT (TEST CELL)** TIX615B.00		
		consisting of:		
2.2.1.1	1	X-METER		
2.2.1.2	1	X-METER VEHICLE-BOX		
2.2.1.3	1	VEHICLE-BOX CABLE 16-PIN LEMO 8M		
2.2.1.4	1	HV-PROBE		
2.2.1.5	1	SENSOR CABLE LEMO 7P-7P 6M		
2.2.1.6	1	CURRENT CLAMP HIOKI CT6841 20A		
2.2.1.7	2	ADAPTERCABLE TEDS HIOKI CT - X-METER		
2.2.2	**1**	**IGEM 2 REGUL. & TC PACK BRAZIL PROCONVE HYBRID & BEV** TEMAOX.00		
		consisting of:		
2.2.2.1	1	IGEM 2 BRAZIL PROCONVE NBR16567_2016 NL		
2.2.2.2	1	IGEM 2 BRAZIL PROCONVE NBR17142		
2.2.2.3	1	IGEM 2 BRAZIL PROCONVE HYBRID HWFET		
2.2.2.4	1	IGEM 2 BRAZIL PROCONVE HYBRID UDDS		
2.2.2.5	1	ADD. iGEM 2 PROJECT ENGINEERING		
2.2.2.6	1	ADD. iGEM 2 INSTALLATION & COMMISSIONING		
2.2.2.7	1	ADD. TRAVEL EXPENSES COMM. iGEM2 EXTENSION		

Total Price Net	**BRL 4.900.000,00**

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CONDIÇÕES COMERCIAIS
B-BRA-7-014-R07 07.02.2017

Prazo de Embarque	Projeto total finalizado em até 14 meses, condicionado a um processo de importação inferior a 1 mês.
Conds. de Pagamento	Purchase Order emitida diretamente para AVL AAT GmbH – Germany Pagamento em EUR em banco no país de origem, com valores de acordo com planilha demonstrativa de conversão ANEXO 2
Conds. de Entrega:	CPT / CFR
Fornecedor/Exportador:	AVL South America Ltda. - Brasil AVL AAT GmbH – Neuss – Germany
Preços	Os preços da parte local referentes a serviços e materiais serão reajustados conforme variação do IGPM entre a data desta cotação e a data do faturamento.
Transporte:	De acordo com suas instruções. O embarque das mercadorias deverá ser realizado em até 30 dias após a data confirmada de entrega mediante recebimento das instruções e autorização de embarque do importador. Após este período os custos de armazenagem dos mesmos na fábrica ou em armazém terceirizado ficarão sujeitos a cobrança.
Validade:	90 dias
Garantia:	12 meses contados a partir do aceite técnico dos equipamentos, não superior a 18 meses da data do embarque, cobrindo peças de reposição e mão-de-obra e desde que a instalação seja realizada por técnicos especializados de nossa empresa. Viagens e estadias de nossos técnicos até suas instalações e/ou o transporte do(s) equipamento(s) até nossas oficinas em São Paulo - SP ou até as instalações do fabricante, nos casos em que isto se fizer necessário, serão cobradas à parte. A importação das peças de reposição a serem trocadas em garantia será de responsabilidade do cliente
Instalação e Treinamento	Serão realizados por técnicos da AVL. Obras civis, instalação de estruturas de sustentação, fundações, bombas, transformadores, alimentação elétrica, etc e colocação de canos, calhas, conduítes, etc serão sempre de responsabilidade do cliente (vide nossas condições de instalação e treinamento CIT – 2005rev3 anexas para detalhamento)
Assistência Técnica	Será realizada por nossos técnicos, nas instalações do cliente ou em nossa oficina em São Paulo - SP, dependendo do tipo de problema apresentado pelo aparelho

Os Termos e Condições Gerais da AVL anexos serão aplicáveis em caso de um pedido de compra, exceto quando disposições diferentes forem negociadas.
Permanecendo ao seu inteiro dispor para prestar esclarecimentos adicionais que se façam necessários firmamo-nos

AVL SOUTH AMERICA

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CONDIÇÕES GERAIS PARA INSTALAÇÃO E TREINAMENTO DE SISTEMAS AVL

DEFINIÇÃO DE RESPONSABILIDADES CIT-2005 REV5

FB-BRA-7-013-R05

(exceto quando incluído no escopo de fornecimento de produtos e serviços AVL)

Descrição	Cliente	AVL
Toda e qualquer obra civil, hidráulica, pneumática e elétrica.	X	
Fundações e estruturas metálicas para dinamômetros, gabinetes, etc.	X	
Dutos, calhas, conduítes elétricos (separados para cabos de potência e de sinal).	X	
Tubulações, mangueiras e cabos (ex. chicotes) do motor.	X	
Alimentação elétrica, fusíveis/disjuntores, chave geral, relês, barramento terra e transformadores (quando necessário) incluindo caixa de entrada próxima aos equipamentos.	X	
Alimentação elétrica e dispositivo de partida do motor.	X	
Alimentação e circuito de água para o dinamômetro, o motor e outros equipamentos, incluindo conexões, além de gerador de água gelada (chiller) - quando aplicável.	X	
Insuflamento / exaustão do ar da sala e exaustão dos gases de escape do motor.	X	
Acabamento da sala (revestimento acústico, tampas de dutos, etc.).	X	
Fixação e chumbamento dos equipamentos e/ou estruturas de sustentação ao solo, teto ou paredes da sala.	X	
Armazenamento em local fechado, seco e arejado	X	
Transporte do(s) equipamento(s) até o local de instalação.	X	
Eixos de acoplamento (cardans) entre motor e dinamômetro e mancais intermediários (quando necessários), bem como a respectiva proteção e as flanges de conexão/adaptação.	X	
Alinhamento do motor – eixo de acoplamento - dinamômetro.	X	
Relês externos ao sistema (partida do motor, ignição, liga/desliga ventilador, etc.)	X	
Instalação dos sensores de temperature e pressão (conexão no motor).	X	
Adaptação mecânica do atuador de acelerador (inclusive a respectiva base).	X	
Sistema de montagem do motor	X	
Flange de adaptação do motor/dinamômetro.	X	
Filtros de combustível, água, ar, etc.	X	
Ferramentas pesadas (talhas, “muncks”, empilhadeiras, etc.).	X	
Motor/veículo em condições de uso para o start-up do equipamento.	X	
Local para guarda de nossas ferramentas e uniformes (com tranca).	X	
Atendimento médico de emergência.	X	
Linha de telefone com linha externa.	X	
Acompanhamento em tempo integral de um técnico/engenheiro de sua empresa.	X	
Dispositivos de calibração de temperatura, pressão, torque, etc.	X	
Para o treinamento: sala adequada e equipamento audio-visual (lousa, retroprojetor, etc)	X	
Gases de calibração e as respectivas tubulações, válvulas e conexões adequados (quando aplicável)	X	
Ligação e conexão elétrica/mecânica dos equipamentos.		X
Start-up dos equipamentos e calibração dos sensores e equipamentos.		X
Instalação e parametrização básica de softwares.		X
Treinamento teórico e prático utilizando-se manuais e/ou apostilas		X
Acompanhamento na elaboração de um teste completo pelo cliente (quando não especificado será um teste europeu 13 pontos para motores ou um teste FTP 75 para veículos).		X
Noções básicas de manutenção (trouble-shooting).		X

Nota: Para a aceitação do sistema será feita uma série de 2 ensaios para verificação de precisão e repetibilidade (quando não especificado será o teste europeu 13 pontos para motores ou o teste FTP 75 para veículos)

Os equipamentos AVL são fabricados em conformidade com as normas Européias CE, detalhadas no anexo ao final desta oferta. A adaptação para atender qualquer normativa Brasileira, bem como a tradução de manuais para o Português, não estão inclusos nesta cotação. Caso haja necessidade os mesmos poderão ser ofertados separadamente.

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OFFERING DESCRIPTION

Technical details to the offered scope can be found in the technical appendix.

1 AVL SLIMLINE SYSTEM

1.1 AMA SL DILUTE - ANALYZER BENCH

1.1.1 AMA SL D1 EMISSION BENCH

The **AVL AMA SL™ D1** is an exhaust measurement system for the continuous analysis of dilute exhaust, of all type of combustion engines modal and from the dilution bags. The AVL AMA SL Dx sample stream analyzes up to eight exhaust gas components with a wide dynamic measurement range, and is suited for the development and certification of combustion engines in accordance with all worldwide valid emissions regulations (e.g. EPA 40 CFR part 1065/1066 and GTR 15), depends on configuration.
Furthermore, the system can be optional equipped with an additional stream for CO_2 measurement to evaluate the dilution ratio (Tracer) and as well with an add-on cabinet to host addition analyzer as FID GC or a 2nd CLD for example.



AMA SL™ single cabinet - for illustration purpose only

The AMA SL™ **D1 Basic Unit** for diluted exhaust measurements includes the AMA SL cabinet with an industrial panel PC, an FID SL analyzer for THC measurement, an CLD SL analyzer for NO or NOx measurement, a preparation for an IRD analyzer with up to 3 channels as well as the bench control software including the online trend chart software iTrend. The system can be operated either directly at the bench via the iGEM AMA Control Software or via AK interface by an automation system.
Two span gas inlets for each analyzer channel is part of the basic configuration.

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General specification (shortened)	
Dimensions (WxHxD)	668 x 1970 x 297 mm / 26.3 x 77.56 x 11.69 inch
Weight (depends on configuration)	Cabinet: approx. 250 kg / 551 lb
Power supply	100 - 230 VAC (N/PE) ± 10%, 50/60 Hz ± 2%
Permissible ambient temperature	+15°C … +40°C / 59°F … 104°F
Ambient pressure	800 … 1050 hPa / 11.6 … 15.23 psi
Sample flow rate	About 2.5 l/min
FID SL analyzer	
Lowest possible measuring range THC	0 ... 3 ppm C3
Highest possible measuring range THC	0 ... 1,000 ppm C3
CLD SL analyzer	
Lowest possible measuring range NO/NOx	0 ... 3 ppm
Highest possible measuring range NO/NOx	0 ... 1,000 ppm
IRD SL analyzer	
IRD analyzer **preparation**	Analyzer to be selected separately

The **AMA SL Dx SGU Extension 3rd – MID-Span** provide an additional 3rd span gas and a dedicated midspan gas inlet for all analyzer channels of an AMA SL Dilute system. The mid-span gas is used for verification of the analyzer linearization curve and is obligatory according to some regulations as EPA 40 CFR Part 1066 or GTR-15.

Stainless-steel reducer piece are provided to connect the AMA SL 4 mm gas supply tubes with 6 mm compression type fittings at the gas panel.

Uninterruptible power supply (UPS) to buffer the 24 V power supply to the integrated panel PC, the display and the MSR card of the system. If the power supply to the system is lost, the UPS will supply the PC and MSR card with power in order to allow a smooth shut down. All applications running on the PC will be closed and the PC will be shut down after 4 minutes.

Scope of Supply

1 PC AMA SL D1 BASIC UNIT
1 PC AMA SL Dx SGU EXTENSION 3RD+MIDSPAN GAS
1 PC AMA SL REDUCER PIECE 6MM - 4MM
1 PC AMA SL UPS EXTENSION BOX FOR PC

1.1.2 AMA SL Dx ANALYZER EXTENSION

The AMA SL™ Dx basic unit contains an FID SL and an CLD SL analyzer for measuring THC and NO/NOx per stream. Depending on the system configuration, the AMA SL can be equipped with additional IRD analyzers. Furthermore, additional analyzer channels like a CH_4 channel, a 2nd CLD channel and other analyzer options can be considered.

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AMA SL™ Analyzer (for illustration only)

With the **Upgrade to Tunnel TWIN FID** the AMA SL Dilute gets the capability to perform THC measurements from a dilution tunnel simultaneously to the CH_4 measurement from the bags.

Additional Component

Lowest possible measuring range CH_4	0 ... 9 ppm C_1
Highest possible measuring range CH_4	0 ... 3,000 ppm C_1

With the **Upgrade CLD NO & NOX Channel**, the CLD analyzer get an additional channel for simultaneous measurement of NO and NO_x in the diluted exhaust. Hence the NO_2 concentration can be calculated. The analyzer complies to the extremely low quenching specifications according to EPA 40 CFR part 1065.

Lowest possible measuring range NO & NO_x	0 … 3 ppm
Highest possible measuring range NO & NO_x	0 … 1,000 ppm

AMA SL™ IRD CO2 L / CO L provide an analyzer module for measurement of gaseous carbon dioxide (CO_2) and carbon monoxide (CO) in AMA SL systems for diluted exhaust.

Measuring principle	Infrared detector for automotive applications, single range
Lowest Possible Measuring Range CO_2	0 … 0.1 %
Highest Possible Measuring Range CO_2	0 … 6.0 %
Lowest Possible Measuring Range CO L	0 ... 50 ppm
Highest Possible Measuring Range CO L	0 ... 20,000 ppm

Scope of Supply

1 PC AMA SL UPGRADE TO TUNNEL TWIN FID
1 PC AMA SL DIL. UPGRADE CLD NO & NOX CHANNEL
1 PC AMA SL IRD CO2 L / CO L

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1.1.3 DISCOUNT FOR USED SYSTEM - AMA SL D1 (GU0678)
TE6BSE.00

The AVL range of services includes a pre-acceptance procedure, installation, commissioning and putting into operation of the system or installation supervision and operator trainings. In addition start-up support by resident engineers is optionally available on request.

Scope of Supply

1 PC DISCOUNT FOR USED SYSTEM - AMA SL D1

1.2 CVS SL - FULL FLOW DILUTION SYSTEM

1.2.1 CVS SL LD LE

The **AVL CVS SL™ LD** is a constant volume sampling system for diesel and gasoline exhaust as well as exhaust from CNG, LPG or alcohol fueled vehicles. It is suitable for a wide range of engine variants from passenger cars to light commercial vehicles. It minimizes the required space and operational cost due to flexible tunnel inlet and outlet directions, new pinch valves for venturi selection, a smart internal gas path design and intuitive software functionalities.
The valve matrix of the CVS SL enables unlimited test cycles which is nowadays important for testing of Hybrid Electric Vehicle according to UN ECE-R101 and other regulations. It also supports performing parallel tasks on different bag pairs such as bag filling, bag analysis and bag evacuation. This brings huge benefits to maximize the test cell efficiency.

The AVL CVS SL™ is ideally suited for the development and certification of combustion engines for passenger cars and light commercial vehicles in accordance with all worldwide valid emission regulations (incl. GTR-15, EPA 40 CFR part 1066 or ECE R-101).

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CVS SL™ LD with double bag cabinets and IPC - for illustration purposes only

The **CVS SL™ LD Basic Unit** (Light Duty) for dilution and sampling of low emission exhaust gas contains a control and dilution cabinet and two heated bag cabinets without an industrial panel PC. It comes with three sample bags each for dilution air and diluted exhaust gas, three bag sampling nozzles, bag valve units and heated sample gas paths made of PFA tubes. It further includes a set of sample filters, mass flow meters, pinch valves for venturi switching and pumps for evacuation, purge, bag filling and bag analysis. The CVS control software can be operated from the AMA bench via the iGEM AMA/CVS multi-configuration software or AK interface by an automation system.

General specification (shortened)	
Dimensions (WxHxD)	668 x 1,970 x 297 mm (each single cabinet) 26.3 x 77.56 x 11.69 inch
Weight (depends on configuration)	CVS main cabinet: approx. 225 kg / 496 lb CVS double bag cabinet: approx. 300 kg / 661 lb
Power supply	100 - 400 VAC (N/PE) ± 10%, 50/60 Hz ± 2%
Permissible ambient temperature	+15°C … +40°C / 59°F … 104°F
CVS flow rate	max. 40 m^3/min
Number of CVS venturis	4 (allows up to 15 flow steps in combination) Size of venturi to be selected separately

The **existing bags** of the CVS SL are **extended from 6 to 12 bags** and one additional valve matrix block enables 3 sample types (instead of two). Hence, the CVS SL provides 4 sets of bags for each dilution air and clean & dirty diluted exhaust.

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Sample Bag Filling Monitoring provide photosensors which are used to monitor the status of filters for the bag filling path and communicate them to the iGEM CVS control software. Automated filter change warnings are issued to notify the operator.

CVS SL critical flow **venturi** (DN50) with a flow rate of **2 m³/min**.

CVS SL critical flow **venturi** (DN50) with a flow rate of **4 m³/min**.

CVS SL critical flow **venturi** (DN65) with a flow rate of **8 m³/min**.

CVS SL critical flow **venturi** (DN65) with a flow rate of **16 m³/min**.

The **CVS SL blower** is a high-performance radial fan operated via a frequency-controlled drive motor. The frequency converter is stored in an electrical distribution cabinet and communicates with the CVS system via CAN-Bus. The blower provides a maximum flow rate of up to **30 m³/min**.

The **silencer** is used to reduce the background noise sound level at the CVS blower outlet. It is installed downstream and as close as possible to the CVS blower. It is designed for installation in an industrial environment and comes with a supporting frame.

The **sound protection hood** is a cover for the CVS blower and is recommended when the blower is installed in an environment that is sensitive to background noise. It comes with screw fittings and a seal at the bottom.

Scope of Supply

1 PC CVS SL LD LE BASIC UNIT W/O IPC
1 PC CVS SL LE BAG EXTENSION 4/4/4
1 PC CVS SL MFC BAG FILLING MONITORING
1 PC CVS SL VENTURI 2M³/MIN
1 PC CVS SL VENTURI 4M³/MIN
1 PC CVS SL VENTURI 8 M3/MIN
1 PC CVS SL VENTURI 16 M3/MIN
1 PC CVS SL BLOWER 30M3
1 PC CVS LD SILENCER FOR UP TO 40 M3/MIN
1 PC CVS LD BLOWER SOUND PROTECTION HOOD

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1.2.2 CVS SL CVS SL BLOWER EXTENSIONS

The **CVS SL blower** is a high-performance radial fan operated via a frequency-controlled drive motor. The frequency converter is stored in an electrical distribution cabinet and communicates with the CVS system via CAN-Bus. The blower provides a maximum flow rate of up to **30 m³/min**.

The **silencer** is used to reduce the background noise sound level at the CVS blower outlet. It is installed downstream and as close as possible to the CVS blower. It is designed for installation in an industrial environment and comes with a supporting frame.

The **sound protection hood** is a cover for the CVS blower and is recommended when the blower is installed in an environment that is sensitive to background noise. It comes with screw fittings and a seal at the bottom.

Scope of Supply

1 PC CVS SL BLOWER 30M3
1 PC CVS LD SILENCER FOR UP TO 40 M3/MIN
1 PC CVS LD BLOWER SOUND PROTECTION HOOD

1.2.3 CVS SL LD DILUTION AIR PREPARATION

This section contains all necessary parts to prepare the dilution air for mixing with the raw exhaust as the dilution air filter, the dilution air heater and pressure control booster for example.

A wall-mounted **2-stage air filter** containing a coarse filter as the 1st stage filter for large particles and a class 14 HEPA filter for fine particles. It comes with a pressure sensor to monitor the pressure drop over the filter, a temperature sensor, and the mounting material. The sensors are fully integrated into the iGEM CVS control software via CAN-Bus communication.

A **combined coarse and activated charcoal** filter is installed in the RMU or VTi LD 2-stage air filter instead of a coarse filter only. It provides additional filtering of the volatile hydrocarbons out of the dilution air.

To avoid condensation, a **dilution air heater (18kW)** is integrated into the RMU or VTi LD dilution air filter.

A PID-controlled **booster blower** to compensate the pressure drop from the CVS filter and piping system and to maintain the vehicle tailpipe static pressure within the required limit.

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Connecting tube (DN200) to transfer the dilution air from a wall-mounted air filter to the VTi dilution system. Depends on application it comes with at least a temperature sensor, a pressures transducer and with connectors for various other sensors.

Scope of Supply

1 PC VTi 2-STAGE DILUTION AIR FILTER
1 PC RMU/VTI ACTIVATED CHARCOAL FILTER
1 PC CVS LD DILUTION AIR HEATER 18 KW
1 PC TPC LD VTI MODULAR
1 PC VTI200 CONN.TUBE AIR FILTER – TUNNEL

1.2.4 CVS SL LD TUNNEL & PIPING

This section contains all necessary hoses and pipes which are conveying the dilution air, raw and diluted exhaust upstream and downstream of the CVS system. These are the tailpipe adaptor, insulated or heated exhaust sample hoses, dilution tunnel, pipes from the dilution tunnel to the CVS cabinet as well as pipes to blower and silencer.

Pipe adapter connects the VTi/CVS flexible hose to the vehicle tailpipe. It contains **six pipe adapters** with different diameters and comes with a mobile support for adaptation to the vehicle tailpipe.

A **three (3) meter heated and insulated stainless steel flexible hose** (DN90) is used to transport the exhaust gas from the vehicle tailpipe to either the (remote) mixing unit or to the riser tube of the CVS system. It contains the necessary mounting material including gaskets and hose clamps.

A project related **specially designed mixing point** (raw inlet DN80) is provided, for space saving fixed installation inside or outside of the test cell at a wall or in the PIT.

The **dilution tunnel** of the CVS SL LD is 2,300 mm long and has a diameter of 200 mm. It includes a sample probe section for various sample probes at the end of the dilution tunnel.

The **CVS TCU Stand Alone Module (PT100) 100-120V** provide a wall-mounted housing which contains a Temperature Control Unit (TCU) with 4 heating circuits with PT100 temperature sensors. The housing includes a ventilation fan with automated circuit breaker and modular cable busing. It is prepared for the installation of 2 additional TCUs.

Stainless steel pipes up to **5 meters** long to complete the CVS system connections, i.e. from the dilution tunnel outlet to the CVS cabinet inlet, from the CVS cabinet outlet to the blower, and other necessary piping depending on the specific layout. It is supplied with elbows, straight pipes and couplings.

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To avoid condensation, the **CVS piping** (DN200) is **insulated**. The insulation is made of glass wool with a thickness of 50 mm and comes with a cover sheet. A maximum length of **5,000 mm** is included.

Diluted exhaust riser tube with a 90° elbow to transfer diluted exhaust gas from an RMU into the dilution tunnel. It is 2000 mm long and has diameter of 200 mm. It comes with a Jacob flange at the end of 90° elbow. At another ending side, the connection can be done via Straub coupling.

A 90° elbow inlet pipe to transfer diluted exhaust gas into the dilution tunnel. It is 430 mm long and has a diameter of 200 mm.

Scope of Supply

1 PC CVS LD EXHAUST PIPE ADAPTER
1 PC HEATED FLEX. EXHAUST TUBE GTR15-3M
1 PC VTi LD MIXING POINT FIX
1 PC VTI200 DILUTION TUNNEL WO ELECTROPOLISH
1 PC CVS TCU STAND-ALONE MODULE (PT100) 100-120V
3 PC CVS PIPE UP TO 5M
3 PC CVS PIPE INSULATION UP TO 5M
1 PC DIL.EXHAUST RISER TUBE W/O ELECTROPOLISH
1 PC 90° ELBOW INLET TUBE W/O ELECTROPOLISH

1.2.5 DISCOUNT FOR USED SYSTEM - CVS SL (GU1207)
TE6BSE.00

For the technical description please refer to pos 1.1.3

Scope of Supply

1 PC DISCOUNT FOR USED SYSTEM - CVS SL

1.3 PSS SL - PARTICLE SAMPLING

1.3.1 PSS SL SD

The AVL PSS SL™ is a gravimetric particulate matter sampling system for full-flow particulate emission measurement. It is suitable for diesel and gasoline direct injection engine variants from passenger cars to commercial vehicles. It minimizes the required space and operational cost thanks to the integrated heated particulate filter cabinet, waste heat recovery from the rotary vane pump and supporting software functionalities.
The AVL PSS SL™ is ideally suited for the development and certification according to all worldwide valid emission regulations (e.g. GTR-15 and EPA 40 CFR part 1065/1066) on chassis and engine dynamometers as well as in powertrain test cells.

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AVL PSS SL™ cabinet (for illustration only)

The **basic unit PSS SL™** for **single dilution** contains a control cabinet with an integrated heated housing in the upper part of the cabinet. It houses a sample probe with hat, volume extender, a rotary shut-off valve, mass flow controller, sample pump, and temperature sensors. In the lower part of the cabinet, it houses an MSR card as well as a universal power distribution unit which includes a LOCC-Box for power consumption monitoring and troubleshooting support. By default, proportional sampling is done via electronic control of the flows. The PSS is either operated via iGEM CVS or iGEM AMA control software by means of a multi-configuration or through the AK interface by an automation system.

General Specifications (shortened)	
Dimensions (WxHxD)	668 x 1,970 x 297 mm / 26.3 x 77.56 x 11.69 inch
Weight (without option)	approx. 200 kg / 441 lb
Power supply	100 - 400 VAC (N/PE) ± 10%, 50/60 Hz ± 2%
Internal power supply 24 V / 48 V DC	24 V / 48 V DC
Permissible ambient temperature	15°C … 40°C / 59°F … 104°F
Heated housing temperature	47 °C ± 5 °C / 116.6 °F ± 9 °F

Single stage **47 mm particulate filter holder** with filter puck for the PSS SL™. It provides an easy mounting with quick connectors as well as easy access to the filter media thanks to the special design of the filter puck.

Scope of Supply

1 PC PSS SL SD BASIC UNIT W/O IPC
4 PC PSS PART. FIL. HOLDER 1X47MM

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1.3.2 DISCOUNT FOR USED SYSTEM - PSS SL (GU1208)
TE6BSE.00

For the technical description please refer to pos 1.1.3

Scope of Supply

1 PC DISCOUNT FOR USED SYSTEM - PSS SL

1.4 NEW EQUIPMENT

1.4.1 NEW iGEM DEVICE SW PACKAGE

The **iGEM AMA Multi-Configuration AMA/CVS/PSS** allows visualization and control of the CVS i60/SL and PSS i60/SL through the iGEM AMA control software. Therefore, the CVS and PSS do not require their own WINDOWS PCs. The iGEM AMA software communicates directly with the MSR cards of the CVS and PSS and allows full control of these systems from the AMA user interface.

The **iGEM AMA CFR 1066 and EURO 6 LD package** extend the iGEM AMA Bench Control software with new diagnostic checks and different calculations as defined in the EPA 40 CFR part 1066, EURO 6 (LD) GTR 15 and China 6 GB18352.6-2016 4 regulations.

The iGEM AMA Bench Control software is extended with the **Web Quality Center iQ diagnostic tool** for monitoring of parameters and values like concentrations and temperatures as well as for history and statistical data evaluation.

The **iGEM CVS CFR 1066 and EURO 6 LD package** extend the iGEM CVS Bench Control software with additional diagnostic checks and different calculations as defined in the EPA 40 CFR part 1066 and EURO 6 (LD) GTR 15 regulations.

The **iGEM PSS CFR 1066 and EURO 6 LD package** extend the iGEM PSS Bench Control software with additional diagnostic checks and different calculations as defined in the EPA 40 CFR part 1066 and EURO 6 (LD) GTR 15 regulations.

Scope of Supply

1 PC IGEM AMA MULTI CONFIGURATION AMA/CVS/PSS
1 PC iGEM AMA 1066 AND EU 6 LD SW EXT.PACKAGE
1 PC IGEM AMA QUALITY CENTER
1 PC iGEM CVS 1066 AND EU 6 LD SW EXT.PACKAGE
1 PC iGEM PSS 1066 AND EU 6 LD SW EXT.PACKAGE

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1.4.2 NEW HARDWARE

New installation material to connect the AVL SlimLine System Dilute to the facility at the new location.

Supply of a set of **heating sleeves** for the fixed **mixing point** or the mixing point in the RMU.

A box for up to 4 particulate filter holders allows easy and safe transport of the particulate filter holders between the weighing chamber and the PSS system. It comes with plastic caps to avoid contamination of the filter media.

Scope of Supply

1 PC NEW INSTALLATION MATERIAL DILUTE
1 PC RMU/VTi HEATING MIXING POINT
1 PC PSS i60 FILTER HOLDER TRANSPORT BOX

1.5 ICAL CALIBRATION AND TEST EQUIPMENT

1.5.1 ICAL CALIBRATION AND TEST EQUIPMENT

Measurement accuracy is highly dependent on the quality of the calibration and test equipment. Therefore, AVL offers different gas dividers, optionally equipped with a NOx converter efficiency checker to perform analyzer linearization, a critical flow orifice (CFO) to check the sample path through the complete AMA-CVS system, and LFE/MFC calibration modules to test the flow rate from the CVS critical flow venturis or the PSS sample line. The calibration and test equipment are embedded in the iGEM Device Center software and allows automated diagnostic functions to be performed.



AVL iCAL™ GNU SL external – for illustration purposes only

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The **iCAL CFO i60 LE 100-120V** (Critical Flow Orifice) unit is used to determine the total accuracy of the CVS sampling system and the emission bench as well as SHED application. It comes with critical flow orifices which are calibrated with pure propane (C_3H_8) as a standard test gas. It provides a selectable flow range between **50 … 430 ml/min**. In addition, the accessories are included as well e.g. Teflon tube, quick connector, injection probe and user guide.

High precision 63 step gas divider for calibration and linearity verification of of analyzers in AMA SL, AMA i60 and SESAM i60 FT systems. It also contains a module to perform NO_x converter efficiency checks. The device is designed for an operation outside the emission system and is equipped with a wide range power supply.

Scope of Supply

1 PC ICAL CFO i60 LE BASIC UNIT 100-120V
1 PC ICAL GNU SL EXT. GDU / NGU 63 STEPS

1.6 AVL PROJECT EXECUTION SERVICES

1.6.1 AVL PROJECT MANAGEMENT & ENGINEERING

AVL offers a comprehensive on-site and inhouse project management and engineering service to ensure a seamless project workflow from the order to commissioning of the offered AVL system(s) into the test field environment.

AVL Project Management (Customer Project) includes all activities necessary to complete the project efficiently and on time according to the scope of supply within AVL and at the customer's site.

The **Specialized Project Manager (PjM-s)** supports the AVL Project Management Customer Project (PjM) and is responsible for the internal project handling.

The **project engineering** contains all planning activities necessary for a correct integration in the customer's test environment as well as the creation of customer specific solutions.

The AVL **Documentation and Software Change** provide the necessary changes in the documentation (flow schematic, electrical drawing, integration of TCU etc.) and in the iGEM Device software related to the offered upgrade / modification.

Scope of Supply
1 PC AVL PROJECT MANAGEMENT - CUSTOMER PROJECT (w. travel)
1 PC AVL AAT PROJECT MANAGEMENT
1 PC AVL AAT PROJECT ENGINEERING
1 PC AVL DOCUMENTATION AND SOFTWARE CHANGE

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1.6.2 DISASSEMBLING & PACKING SL DILUTE

Contains the disassembling of the used AVL SlimLine System dilute and the packing for shipping by two AVL AAT Technicians.

Prerequisite:
- A functioning, faultless, and well-maintained system.
- At arrival of the AVL AAT Technicians the System must be switched on and able to for perform all kind of tests.

Note:
- Disassembling and packing of piping (except dilution tunnel) is not include and must be provided by PTE if required.

AVL AA Technician(s) perform a pre-check of the AVL SlimLine system dilute to check the correct and error free functionality.

AVL AAT Technician(s) perform disassembling and packing of the AVL SlimLine system dilute at customer site.

Travel expenses of the AVL employee(s) during the execution of on-site work according to the scope of the AVL proposal, without options and alternatives.

Shipping of **packing material** provide the provision of proper packing material for the AVL SlimLine moving and the shipping to the place of disassembling.

Scope of Supply

1 PC AVL LABOR ON SITE - PRE-CHECK SL DILUTE
1 PC AVL LABOR ON SITE - DISASSEMBLING SL DILUTE
1 PC TRAVEL EXPENSES DISASSEMBLING DILUTE
1 PC PACKING MATERIAL & SHIPPING

1.6.3 AVL DEVICE INSTALLATION

AVL's onsite and/or remote installation services for AVL equipment as installation, commissioning and ramp-up support for example, performed by experienced and qualified specialists and consist of the following:

During the **Installation** the **single stream AMA SL™** cabinet, internal modules and the sampling system(s) will be unpacked, checked for completeness, assembled, and connected with the facility (electrical and mechanical installation). Internal transportation at customer site including moving/placing the system into its final location e.g. the test cell or measuring room is not included.

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During the **AMA SL™ 1-Stream Basic Commissioning** a brief operator instruction is given, basic and advanced checks are performed (e.g. zero- and span adjustments, leak and linearity checks, CLD quench check, …) and a remote check of the AK interface is executed. Finally, the AMA SL system is handed over to the customer according to the AVL Standard **Final Acceptance** Protocol.

During the **Installation** the **CVS SL™ LD** cabinets and internal modules are unpacked, checked for completeness, assembled, and connected with the facility (electrical and mechanical installation). Internal transportation at customer site including moving/placing the system into its final location e.g. the test cell or measuring room is not included.

During the **CVS SL™ LD Basic Commissioning** a brief operator instruction is given, basic and advanced checks are performed (e.g. remote/manual mode, clean/dirty mode (if applicable), set bag fill rate, cabinet heating on/off, line/bag leak check, …) and a remote check of the AK interface is executed. A manual system verification with a CFO kit is performed in the end. Finally, the CVS SL system is handed over to the customer according to the AVL Standard **Final Acceptance** Protocol.

During the **Installation** the **PSS SL™** cabinet(s) and internal modules are unpacked, checked for completeness, assembled, and connected with the facility (electrical and mechanical installation). Internal transportation at customer site including moving/placing the system into its final location e.g. the test cell or measuring room is not included.

During the **PSS SL™ Commissioning** a brief operator instruction is given, basic and advanced checks are performed (e.g. remote/manual mode, load particulate filter, setting of background/exhaust sample flow rate, …) and a remote check of the AK interface is executed. Finally, the PSS SL system is handed over to the customer according to the AVL Standard **Final Acceptance** Protocol.

During the **installation** of the **VTi LD System** the dilution tunnel, air filter, pipes and hoses are unpacked and assembled to the predefined interfaces with all necessary supplies and disposals. It includes a check for completeness of the scope of supply and documentation according to the contract, check of the pneumatic and electrical supply and check of the mechanical connection of the system components.

Travel expenses of the AVL employee(s) during the execution of on-site work according to the scope of the AVL proposal, without options and alternatives.

Scope of Supply

1 PC	AMA SL INSTALLATION - 1 STREAM
1 PC	AMA SL COMM. & FAT - 1 STREAM - BASIC
1 PC	CVS SL INSTALLATION
1 PC	CVS SL COMMISSIONING & FAT - BASIC
1 PC	PSS SL INSTALLATION
1 PC	PSS SL COMM. & FAT
1 PC	VTi LD INSTALLATION
1 PC	TRAVEL EXPENSES INST. & COMM.

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2 AVL EMISSION AUTOMATION SYSTEM

2.1 iGEM 2 BASIC SOFTWARE & HARDWARE

2.1.1 IGEM 2 VEHICLE SOFTWARE LICENCES

AVL iGEM 2™ is the automation application for energy & emission test cycle execution, the control of related measurement devices and the execution of measurement device checks and calibrations. It is based on the AVL PUMA 2™ Testing Software. The application features are tailored to certification testing, conformity of production (COP) as well as R&D on combustion engines, hybrid & pure electric vehicles.



AVL **iGEM 2™ for Vehicle Testing** is the most sophisticated automation system for chassis dyno testbeds test cycle execution, the control of related measurement devices and the execution of measurement device checks and calibrations. Required licenses for AVL Drivers Aid are included in the base package.

The AVL iGEM 2™ **Device Control Module for dilute measurements** coordinates the distribution of commands related to devices in the diluted exhaust gas stream.

The AVL iGEM 2™ **Calibration and Device Check Package** allows for fully automated execution of device checks and calibrations based on the selected legislative regulation.

The AVL iGEM 2™ **Data Processing Toolbox Testbed NL** based on AVL CONCERTO™ is a powerful work environment for the calculation and report generation of iGEM 2 test data.
It can be extended by iGEM 2 legislative calculation packages for fast data processing, data verification and report creation. The Transparent Calculation Machine is open for extensions and allows maintenance of changes down to individual formula versions. The AVL iGEM 2 Data Processing Toolbox supports dynamic reports that automatically adapt to the environment the tests are conducted. Whether its easy-to-use creation of test specific reports in Microsoft Excel via drag-and-drop of formula results or analysis of calculation paths with the dependency viewer working with the AVL iGEM 2 Data Processing Toolbox is the streamlined way to trustworthy and reliable results.

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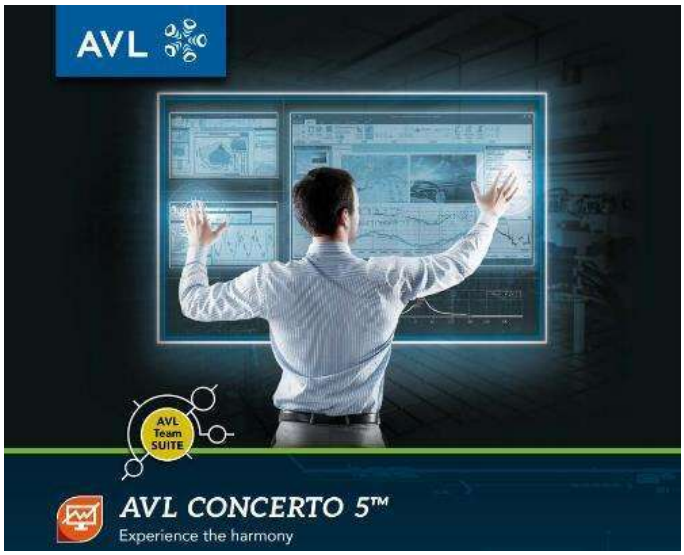
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Scope of Supply

1 PC IGEM 2 FOR VEHICLE TESTING
1 PC iGEM 2 DILUTE DEVICE CONTROL MODULE
1 PC iGEM 2 CALIBRATION AND DEVICE CHECKS
1 PC IGEM 2 DATA PROCESS. TOOLBOX TESTBED NL

2.1.2 AVL CONCERTO 5 EXTENSION

AVL CONCERTO 5™ is part of the iGEM 2™ for Vehicle Testing basic license and is the generic data processing platform for visualizing, analyzing, and reporting many measured and simulated data types.



Its powerful optional extension enables the individualization of tool functionalities to turn data collected throughout the vehicle development process into decision-relevant information.

The **ASAM Write** software extension provides edit- and write back functionality of ASAM-ODS data while the original data is preserved.

The AVLCONCERTO 5™ - **Application Development Toolbox NL** allows a quick and easy creation of CONCERTO-based and automatic evaluations, including formulae, scripts and macro development.

Scope of Supply

1 PC ASAM WRITE (COMPOSER) OPTION NL
1 PC CONCERTO ADK LIZENZ NL

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2.1.3 IGEM 2 VEHICLE HARDWARE (Typical)

AVL iGEM 2™ Automation Hardware is an integrated part of the AVL iGEM 2™ for Vehicle Testing solution and is required for the operation of the vehicle testbed.

The **iGEM 2™ for Vehicle Testing 20 HU Trolley** comes in a 19" trolley-cabinet setup. It is equipped with the basic necessary hardware to run the AVL iGEM 2™ for Vehicle Testing automation system. The system runs under Microsoft© Windows 10.



20 HU Trolley – for illustration purposes only

The **AVL Testbed Driver's Aid 12 HU Trolley** includes a 21,5" Display which is mounted on a portable stand. It's mobile and compact design allows full flexibility to place it as close as possible to the vehicle, with a maximum range of 25m (standard video cable length; extension available on demand).
The Driver's Aid guides the driver of a vehicle on a chassis dynamometer through legal or user configured driving cycles.



DA 12-HU-Trolley - for illustration purposes only

The **AVL Testbed Driver's Aid Remote Control** is a 4 button wireless device to navigate within the drivers aid while sitting in the vehicle. Actions like test start/stop or dyno control functions can be controlled via the pendant. The scope of delivery includes also an receiver unit with antenna which can be mounted on a suitable place within the test cell.

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DA Remote control – for illustration purposes only

The iGEM 2™ **WEATHER STATION** Indigo 520 contains a barometric pressure sensor, as well as a pluggable HMP3 Humidity & Temperature probe to measure ambient conditions within the test cell.



Weather Station VAISALA INDIGO 520 – for illustration purposes only

The AVL Testbed **OBD LINK hardware** contains the necessary components for the connection between the AVL automation system and an OBD II port of the vehicle. In combination with the AVL Testbed OBD software, multiple OBD PID scan lists can be defined, and vehicle data can be retrieved.

Scope of Supply

1 PC iGEM 2 FOR VEHICLE TESTING BASE SYSTEM 20HU
1 PC AVL TESTBED DRIVERS AID 12 HU TROLLEY
1 PC AVL TESTBED DRIVERS AID REMOTE CONTROL
2 PC IGEM 2 WEATHER STATION INDIGO 520
1 PC AVL TESTBED OBD LINK HW

2.1.4 IGEM 2 REGUL. & TC PACK BRAZIL PROCONVE

AVL iGEM 2™ Regulation and Test Cycle Package includes all necessary software modules that are required to process test data generated with iGEM 2 on the test bed. Applying the modular concept of iGEM 2, customers can extend required legislations for their R&D or certification testing.

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The AVL iGEM 2 Data Processing for Brazil Proconve ABNT_NBR_6601_2021 provides calculations, verifications, and reports for the below listed legislative regulations:

Article Name	Name
Brazil Proconve	Brazil Proconve ABNT_NBR_6601_2021

This data processing package is provided as a Node Locked license.

The AVL iGEM 2 Data Processing for US 1066 provides calculations, verifications, and reports for the below listed legislative regulations:

Article Name	Name
40 CFR 1066	US EPA CFR title 40 Part 1066, 2017 edition as published by the US Government Publication Office US EPA CFR title 40 Part 1066, 2020 edition as published by the US Government Publication Office mass flow based US EPA CFR title 40 Part 1066, 2020 edition as published by the US Government Publication Office molar based US EPA CFR title 40 Part 1037, 2020 edition as published by the US Government Publication Office

This data processing package is provided as a Node Locked license.

The iGEM 2 Brazil Proconve FTP75 package offers the listed test cycles, legislative limits, and procedures.

Cycle package	Type	Name
Brazil Proconve	Test cycle	Brazil Proconve FTP75
	Legislation limits	Brazil Proconve

The iGEM 2 Brazil Proconve HWFET package offers the listed test cycles, legislative limits, and procedures.

Cycle package	Type	Name
Brazil Proconve	Test cycle	Brazil Proconve HWFET
	Test cycle	Brazil Proconve HWFET/HWFET
	Legislation limits	Brazil Proconve

The iGEM 2 US EPA NYCC package offers the listed test cycles, legislative limits, and procedures.

Cycle package	Type	Name
US EPA NYCC	Test cycle	EPA NYCC
	Legislation limits	40 CFR Part 86, specified in paragraph (e) of Appendix I

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The iGEM 2 US Evaporate Preparation Cycles package offers the listed test cycles, legislative limits, and procedures.

Cycle package	Type	Name
US Evaporate Preparation Cycles	Test cycle	US Evaporate Preparation Cycles Running Loss
	Test cycle	US Evaporate Preparation Cycles FTP72
	Test cycle	US Evaporate Preparation Cycles FTP75
	Legislation limits	40 CFR Part 86 Subpart B (2020)
	Legislation limits	40 CFR Part 1066 Subpart I (2020)

Scope of Supply

1 PC IGEM 2 BRAZIL PROCONVE NBR6601_2021 NL
1 PC IGEM 2 US 1066 NL
1 PC IGEM 2 BRAZIL PROCONVE FTP75
1 PC IGEM 2 BRAZIL PROCONVE HWFET
1 PC IGEM 2 EPA US NYCC
1 PC IGEM 2 US EVAPORATE PREPARATION CYCLES

2.1.5 AVL iGEM 2 PROJECT SERVICES

AVL Project Service for iGEM 2 is performed by experienced and qualified specialists and consists of the following packages:

AVL Project Management (Customer Project) includes all activities necessary to complete the project efficiently and on time according to the scope of supply within AVL and at the customer's site.

The **Specialized Project Manager (PjM-s)** for iGEM 2™ supports the overall AVL project leader (PjM) and is responsible for AVL internal handling of the AVL iGEM 2 sub-project. iGEM projects are managed by experienced and qualified project manager. It is the responsibility of the AVL iGEM 2 Project Manager to assure the project is executed within the specified scope, in time and budget.

The **AVL iGEM 2™ Project Engineering** is performed by an experienced iGEM 2™ Project Engineer. The Project Engineer prepare the setup and system configuration according to the desired application during the order fulfillment process.

The AVL **iGEM 2™ Commissioning** covers the installation process of the iGEM 2™ system components as well as the commissioning and checking of the contractually agreed functionalities.

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The AVL **iGEM 2™ Final Acceptance** is performed to demonstrate the completeness, functionality, and performance of the installed and commissioned AVL iGEM 2™ emission test automation.

Travel expenses of the AVL employee(s) during the execution of on-site work according to the scope of the AVL proposal, without options and alternatives.

Scope of Supply

1 PC AVL PROJECT MANAGEMENT - CUSTOMER PROJECT
1 PC iGEM 2 PROJECT MANAGEMENT
1 PC iGEM 2 PROJECT ENGINEERING
1 PC iGEM 2 INSTALLATION & COMMISSIONING
1 PC iGEM 2 ACCEPTANCE
1 PC TRAVEL EXPENSES INST. & COMM.

2.1.6 TRAINING FOR TESTBED AUTOMATION

In this section you will find courses designed to enhance your knowledge and skills on AVL Testbed Automation for different applications.



The training usually takes place in our training center in Graz (Austria). On request a training at customer site with his system is possible.

The **Training Operation & Basic Parametrization of iGEM 2™** refers to version iGEM 2™ FOR VEHICLE TESTING at for chassis dyno.

Target Group
Operation (Test Operator, Test Engineer).

Target

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The participants understand the function of AVL iGEM 2 VEHICLE and can operate the chassis dyno automation system. Meaning of Manual Data Entry windows (pretest dialog) is known and AVL iGEM 2 VEHICLE test runs can be executed.

Travel expenses of the AVL employee(s) during the execution of on-site work according to the scope of the AVL proposal, without options and alternatives.

Scope of Supply

1 PC TRAINING IGEM 2 VEHICLE
1 PC TRAVEL EXPENSES TRAINING iGEM 2 ON-SITE

2.2 BEV/HEV/PHEV EXTENSION

2.2.1 BATTERY DEPLETING MEASUREMENT (TEST CELL)

The **AVL X-meter™ Battery System** is a compact and flexible data acquisition and power analyzer system which is designed for electrical DC power and energy distribution/balancing measurements especially in pure battery-electric and hybrid vehicles. It operates either in stand-alone mode (without any control PC) as a calculation result provider or as a raw-data analyzer in conjunction with AVL IndiCom, AVL iGEM 2, or AVL CHARGE MONITOR SW.



Illustration purpose only

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Application
E-power: Range / Certification testing

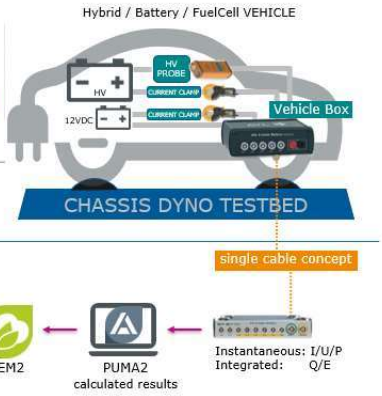
Energy consumption during standard test cycles

Measurement task:

RESS (rechargeable storage systems)

Measure currents + energy consumption during standard test cycles

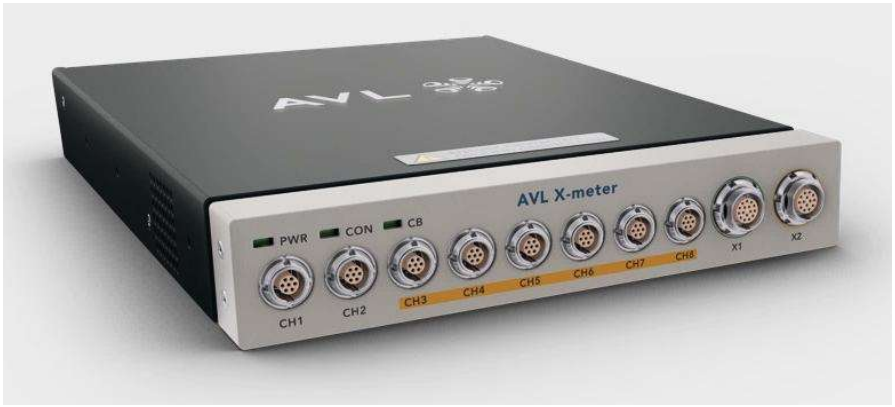




Advantages

- Vehicle box: pre setup of sensors connected to a central box within the vehicle in advance
- Preparation of various vehicles with a vehicle box
- Single Cable Concept: one cable from vehicle box to X-meter. Fast and safe connection avoiding mixing channels

The AVL **X-meter™** is a compact and flexible 10 channel data acquisition system. It measures and processes electrical DC and AC signals from various sources with a sampling rate of 50 kHz.
Signals can either be recorded as raw time traces by AVL IndiCom Time™ or be further processed in the hardware to evaluate the charge, power energy etc. The X-meter™ can also be directly connected to an automation system without an extra PC and the real processed values transferred with an update rate of 20Hz.



AVL X-meter™ - for illustration purposes only

The **X-meter™ Vehicle Box** is an optional accessory to simplify the setup and instrumentation efforts of battery electric and plug-in hybrid vehicles.
The Vehicle-Box is meant to be connected between the X-meter and the vehicle. The Vehicle-Box is connected to the X-meter through a single cable concept.

Vehicle Box Cable 16-PIN LEMO 8 meter for direct connection of the AVL X-meter Vehicle Box to the AVL X-meter.

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The **High Voltage HV Probe** is an analog signal conditioning unit to measure high DC voltages in battery electric and hybrid vehicles.
This device is a compact one channel unit for the transformation of a high DC-voltage to ground related low voltage (±10 V peak). It can be connected via a shielded LEMO 7-pin cable to the inputs of the AVL X-meter or other data acquisition units like AVL X-ion.

One 7 PIN **LEMO sensor cable** (6 meter) for direct connection of sensors e.g. AVL current clamps or high voltage probes to the AVL X-meter™.

The **Hioki CT6841A** is a high performance zero flux **20A current clamp** developed for large AC and DC current applications like electric or hybrid powertrains. At Ø 20,0 mm in the center hole of the sensor unit, most applications/primary conductors of automotive electric powertrain will fit.
The current clamp transforms the high primary current to a respective galvanically isolated secondary voltage.

Adaptor cable TEDS (power supply and signal) between AVL X-meter™ and a Hioki current clamp CT68xx-05 series.

Scope of Supply

1 PC X-METER
1 PC X-METER VEHICLE-BOX
1 PC VEHICLE-BOX CABLE 16-PIN LEMO 8M
1 PC HV-PROBE
1 PC SENSOR CABLE LEMO 7P-7P 6M
1 PC CURRENT CLAMP HIOKI CT6841 20A
2 PC ADAPTERCABLE TEDS HIOKI CT - X-METER

2.2.2 IGEM 2 REGUL. & TC PACK BRAZIL PROCONVE HYBRID & BEV

AVL iGEM 2™ Regulation and Test Cycle Package includes all necessary software modules that are required to process test data generated with iGEM 2 on the test bed. Applying the modular concept of iGEM 2, customers can extend required legislations for their R&D or certification testing.

The AVL iGEM 2 Data Processing for Brazil Proconve ABNT_NBR_16567_2016 provides calculations, verifications, and reports for the below listed legislative regulations:

Article Name	Name
iGEM 2 Brazil Proconve Hybrid	ABNT_NBR_16567_2016

This data processing package is provided as a Node Locked license.

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The iGEM 2 Brazil Proconve Hybrid HWFET cycle package offers the listed test cycles, legislative limits, and procedures.

Cycle package	Type	Name
Brazil Proconve LDV Hybrid	Test cycle	iGEM 2 Brazil Repeating HWFET Charge Depleting Drive Cycle
	Test cycle	iGEM 2 Brazil HWFET/HWFET Charge Sustaining Cycle
	Legislation limits	ABNT_NBR_16567_2016

The iGEM 2 Brazil Proconve Hybrid UDDS cycle package offers the listed test cycles, legislative limits, and procedures.

Cycle package	Type	Name
Brazil Proconve LDV Hybrid	Test cycle	iGEM 2 Brazil Repeating UDDS 1 Phase Charge Depleting Drive Cycle
	Test cycle	iGEM 2 Brazil Repeating UDDS 2 Phase Charge Depleting Drive Cycle
	Legislation limits	iGEM 2 Brazil UDDS/UDDS 2 Phase Charge Sustaining Cycle
	Legislation limits	ABNT_NBR_16567_2016

Additional AVL **iGEM 2™ Project Engineering** to the offered related extension / option.

Additional AVL **iGEM 2™ Commissioning** to the offered related extension / option.

Necessary **additional travel expenses** of the AVL employee(s) for performing on-site work on the offered related extension/option of the AVL equipment.

Scope of Supply

1 PC IGEM 2 BRAZIL PROCONVE NBR16567_2016 NL
1 PC IGEM 2 BRAZIL PROCONVE NBR17142
1 PC IGEM 2 BRAZIL PROCONVE HYBRID HWFET
1 PC IGEM 2 BRAZIL PROCONVE HYBRID UDDS
1 PC ADD. iGEM 2 PROJECT ENGINEERING
1 PC ADD. iGEM 2 INSTALLATION & COMMISSIONING
1 PC ADD. TRAVEL EXPENSES COMM. iGEM2 EXTENSION

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TERMS AND CONDITIONS

The current version of AVL and its affiliate companies General Terms and Conditions applies, which we will send on request.

This offer is subject to the relevant export regulations from EU and/or US authorities and the settlement at time of delivery of the goods. No claims whatsoever can be accepted resulting from late delivery or cancellation due to late receipt or refusal of export approval by the responsible authorities.

The delivery periods and delivery dates specified by AVL in this offer are subject to the timely availability of purchases on the procurement market, as no corresponding binding commitments are possible due to the current tense market situation. Accordingly, if AVL is unable to meet a deadline due to a lack of availability or untimely availability of purchases despite the implementation of all necessary and reasonable measures, AVL shall immediately notify customer thereof in writing. Subject to AVL's fulfillment of the aforementioned requirements, AVL shall not be liable for any consequences of delay. In this case, the parties shall mutually agree on a corresponding extension of milestones and/or deadlines.

No Re-Export to Russia and Belarus

(1) The [Importer/Buyer] agrees not to sell, export, or re-export, either directly or indirectly, any goods provided under or related to a Contract/Order to the Russian Federation or for use in the Russian Federation and to Belarus or for use in Belarus, as specified under Article 12g of Council Regulation (EU) No 833/2014 (for the Russian Federation) and Article 8g of Council Regulation (EC)

(2) The [Importer/Buyer] shall ensure that the restrictions in paragraph (1) are not bypassed by any third parties in the supply chain, including potential resellers.

(3) The [Importer/Buyer] shall implement and maintain effective monitoring systems to detect and prevent any actions by third parties that would violate paragraphs (1) or (2). This includes maintaining detailed records and documentation of compliance efforts, which must be kept for a minimum of 5 years after the termination of the Contract/Order.

(4) The [Importer/Buyer] shall promptly notify the [Exporter/Seller] of any issues in complying with paragraphs (1), (2), or (3), including any relevant activities by third parties that could compromise the objectives of paragraphs (1) or (2).

(5) The [Importer/Buyer] shall provide the [Exporter/Seller] with the necessary information and documentation to demonstrate compliance with its obligations under this clause within two weeks of a request.

(6) The [Exporter/Seller] may audit the [Importer/Buyer]'s business and production sites at any time to verify the [Importer/Buyer]'s adherence to its obligations under this clause. Audits will be conducted with reasonable notice and during the [Importer/Buyer]'s regular business hours. The [Exporter/Seller] will safeguard any confidential information or trade secrets encountered during such audits.

(7) Any breach of paragraphs (1) to (5) will be considered a material breach of the affected Contract/Order, and the [Exporter/Seller] may pursue appropriate remedies, including, but not limited to:

(i) terminating the Contract/Order without notice; and

(ii) liquidated damages amounting to 10% of the total value of the Contract/Order or the price of

the goods exported, whichever is higher, unless the [Importer/Buyer] is not responsible for the breach.

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TECHNICAL APPENDIX

1.1.1 AMA SL D1 EMISSION BENCH

1.1.1.1 AMA SL D1 BASIC UNIT

General system specifications	
Dimensions (WxHxD)	668 x 1970 x 297 mm / 26.3 x 77.56 x 11.69 inch
Weight (depends on configuration)	Cabinet: approx. 250 kg / 551 lb
Power supply	100 - 230 VAC (N/PE) ± 10%, 50/60 Hz ± 2% or optionally 400 VAC available
Power consumption	Max. 2.6 kVA; 16 A pre-fuse required
Permissible ambient temperature	+15°C … +40°C / 59°F … 104°F
Exhaust extraction (depends on configuration)	8.5 m³ / hour
Sample flow rate	About 2.5 l/min
Permissible inlet pressure	+300 hPa relative from CVS system
Material (of gas leading components)	Stainless steel, PFA (tubes), Viton (seals)
Interfaces	LAN TCP/IP, RS232 (AK protocol)
General analyzer specifications	
Linearity	≤ 2 % of measured value (10 – 100 % of range full scale) or ≤ 1 % range full scale, whichever is smaller
Permissible ambient pressure	700 … 1,100 hPa abs. / 10.15 … 15.95 psi abs.
Digital interface	CAN bus with CANopen protocol
Signal processing	Raw signal via iGEM AMA bench control SW
Detection limit	≤ 0.3 % of lowest range full scale
FID SL	
Measuring principle	Flame ionization detector for automotive applications, single range
Measured compounds	THC
Power supply	24 V DC
Power consumption	max. 125 W
Dimensions (WxHxD)	400 x 246 x 140 mm / 15.75 x 9.69 x 5.51 inch
Weight	9 kg
Lowest possible measuring range THC	0 ... 3 ppm C_3
Highest possible measuring range THC	0 ... 1,000 ppm C_3
t_{10-90} time / t_{90} time	≤ 0.5 sec / ≤ 1.2 sec
Flow rate of sample gas	Ca. 18 l/h @ 250 hPa
Flow rate of span gas	Ca. 0.3 l/min
Sample gas condition	Heated at 191 °C / 375.7 °F; Particulates ≤ 5 µm
Required operation gases	Burner air: synthetic air, HC-free Fuel: H_2/He-mixture, HC-free Span gas: propane in N_2 or synth. air Zero gas: N_2 or synthetic air, HC-free Control air: compressed air
CLD SL	
Measuring principle	Chemiluminescence detector for automotive applications, single range
Measured compounds	NO / NO_x

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Power supply	24 V DC
Power consumption	Max. 230 W
Dimensions (WxHxD)	400 x 430 x 140 mm 15.75 x 16.9 x 5.5 inch
Weight	21 kg
Lowest possible measuring range NO/NOx	0 ... 3 ppm
Highest possible measuring range NO/NOx	0 ... 1,000 ppm
t_{10-90} time / t_{90} time NO t_{10-90} time / t_{90} time NOx	≤ 1.0 / ≤ 1.0 sec ≤ 1.5 / ≤ 1.8 sec
Flow rate of sample gas	ca. 12 l/h @ 250 hPa
Flow rate of span gas	ca. 0.25 l/min
Sample gas condition	Dew point ≤ 55 °C / 131 °F; Particulates ≤ 5 µm
Required operating gas	Ozone generation: oxygen O_2 Span gas: nitrogen monoxide NO in N_2 Zero gas: nitrogen N_2
Converter efficiency	≥ 95 %
Quenching NO / NO_x	Combined CO_2- and H_2O quench ≤ 1 %
IRD SL analyzer preparation	Analyzer to be selected separately

- For further details please refer to the specific data sheet.

Basic functionality of the iGEM AMA bench control software:

- Averaging by integrators (remote or user interface)
- Linearity check via Gas Divider Unit (GDU)
- NO_x converter check via NO_x Generator Unit (NGU)
- Leak check (vacuum, CO_2 and O_2 method)
- THC Hang-up check
- Drift check
- CH_4 converter check for optional dual channel Cutter FID
- Unit check (check of analyzer by external sample, e.g. bag)
- System check (check of all analyzers by external sample, e.g. bag)
- Calculated channels (Lambda Brettschneider, Lange, Spindt, Stivender, Air/Fuel Ratio, NMHC, NO_2, etc.) depending on hardware configuration.
- Mid-span check depending on hardware configuration.
- Span bottle consistency check
- Span purge check
- Cross sensitivity check for infrared analyzers
- Online data trend chart module for visualization and recording the data of the iGEM AMA.

1.1.1.2 AMA SL Dx SGU EXTENSION 3RD+MIDSPAN GAS

The mid-span gas is used for verification of the analyzer linearization curve and is obligatory according to some regulations like EPA 40 CFR Part 1066 or GTR-15. The concentration of the mid-span gas is typically in the range of 30 to 50 % of the smallest measuring range of an analyzer. For optional higher ranges the span gas of the next lower range acts as a mid-span gas.

Example 3 span gases and mid-span:

Span Gas concentration		Analyzer range 1: 10 ppm	Analyzer range 2: 20 ppm	Analyzer range 3: 50 ppm
4.5 ppm	SGU inlet 1	Mid-Span		
9.6 ppm	SGU inlet 2	Span 1	Mid-Span	
18.4 ppm	SGU inlet 3		Span 2	Mid-Span
48.2 ppm	SGU inlet 4			Span 3

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1.1.1.3 AMA SL REDUCER PIECE 6MM - 4MM

No further technical information

1.1.1.4 AMA SL UPS EXTENSION BOX FOR PC

No further technical information

1.1.2 AMA SL Dx ANALYZER EXTENSION

1.1.2.1 AMA SL UPGRADE TO TUNNEL TWIN FID

An external sampling system with sample probe in the Dilution Tunnel, spill overflow valves, heated lines, and a filter-pump module as well as the bench internal heated manifold and a TWIN FID analyzer are provided.

Power Consumption	max. 160 W (24 V DC)
Lowest possible measuring range CH_4	0 ... 9 ppm C_1
Highest possible measuring range CH_4	0 ... 3,000 ppm C_1
t_{10-90} time CH_4	≤ 1.5 sec
t_{90} time CH_4	≤ 5 sec
Converter efficiency	≥ 98 % for NMHC

- For further details please refer to the specific data sheet!

1.1.2.2 AMA SL DIL. UPGRADE CLD NO & NOX CHANNEL

General Specifications	
Power Consumption	Max. 250 W
Lowest possible measuring range NO/NOx	0 … 3 ppm / 0 … 3 ppm
Highest possible measuring range NO/NOx	0 … 1,000 ppm / 0 … 1,000 ppm
t_{10-90} for NO/NO_x t_{90} for NO/NO_x	≤ 1.0 sec. / ≤ 1.0 sec. ≤ 1.5 sec. / ≤ 1.8 sec.
Quenching NO/NO_X	Combined CO_2 and H_2O quench < 1% For all fuel types including CNG, LPG and biofuels. Proof of quench specifications requires highly accurate equipment for H_2O generation making the verification in the field difficult.
Converter efficiency	≥ 95 %

- For more detailed information please see the specific data sheet.

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1.1.2.3 AMA SL IRD CO2 L / CO L

General Specifications	
Measuring principle	Infrared detector for automotive applications, single range
Power Consumption	Max. 100 W /24 V DC)
Dimensions	440 x 129 x 215 mm
Weight	Ca. 8 kg
Lowest Possible Measuring Range CO_2 L	0 … 0.1 %
Highest Possible Measuring Range CO_2 L	0 … 6.0 %
Lowest Possible Measuring Range CO L	0 ... 50 ppm
Highest Possible Measuring Range CO L	0 ... 20,000 ppm
T_{10-90} for CO_2 L / CO L T_{90} for CO_2 L / CO L	≤ 1.2 sec / ≤ 1.5 sec ≤ 1.8 sec / ≤ 2.5 sec
Flow Rate Sample Gas	Each approx. 30 l/h
Sample Gas Conditions	Dew point ≤ 30 °C / 86 °F; Particulates ≤ 5 µm

- For more detailed information please see the specific data sheet.

1.1.3 DISCOUNT FOR USED SYSTEM - AMA SL D1 (GU0678)
TE6BSE.00

1.1.3.1 DISCOUNT FOR USED SYSTEM - AMA SL D1

1.2.1 CVS SL LD LE

1.2.1.1 CVS SL LD LE BASIC UNIT W/O IPC

General system specifications	
Dimensions (WxHxD)	668 x 1,970 x 297 mm (each single cabinet) / 26.3 x 77.56 x 11.69 in.
Weight (depends on configuration)	CVS main cabinet: approx. 225 kg / 496 lb CVS double bag cabinet: approx. 3,050 kg / 661 lb
Power supply	100 - 400 VAC (N/PE) ± 10%; 50/60 Hz ± 2% (Via AVL CVS blower electrical cabinet)
Internal power supply	24 V / 48 V DC
Power consumption	Approx. 3.6 kVA
Pressurized air	5 … 7 bar
Permissible ambient temperature	+15°C … +40°C / 59°F … 104°F
Permissible relative humidity	Max. 80%, non-condensing
Permissible ambient pressure	900 – 1,100 hPa / 13.05 – 15.95 psi
Permissible operating altitude	2,000 meters (with reduced flow rate)
Background noise level	65 dBA (CVS main cabinet)
Material (of gas leading components)	Stainless steel, PFA (tubes), Viton (seals)
Interfaces	LAN TCP/IP, RS232 (AK protocol)
Technical specifications	
Number of venturis	4 (allows up to 15 steps in combination)
Flow rates	Max. 40 m3/min (at ambient condition 1,013 hPa)
Number of sampling nozzles	Max. 3 (1, 2 and 3 l/min); optional mass flow controller

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Sampling flow rate	1 … 5 l/min
Bag material	Kynar
Bag volume	75 L (overall bag cabinet volume 175 L)
No. of bags	6 bags (4 in 1st cabinet, 2 in 2nd cabinet)
Max. number of bags	Optional: up to 16 (with 3rd bag cabinet)
Bag evacuation time	Max 1 min. per bag
Max. temperature of diluted exhaust gas	80°C / 176°F

- For further details please refer to the specific data sheet

Basic functionality of the iGEM CVS bench control software:
- Fill / Evacuate / Purge / Standby / Pause
- Leak check (bag & line leak check)
- LFE calibration (single venturi calibration)
- Sensor calibration
- Hang-up check (in conjunction with AVL AMA SL) Span purge check
- Online data trend chart module for visualization and recording the data of the iGEM CVS.

1.2.1.2 CVS SL LE BAG EXTENSION 4/4/4

CVS SL bag configuration:				
Sample types	Phase 1	Phase 2	Phase 3	Phase 4
Dilution air	Bag Cab. 1	Bag Cab. 2	Bag Cab. 1	Bag Cab. 2
Diluted exhaust 1 (Clean)	Bag Cab. 2	Bag Cab. 1	Bag Cab. 1	Bag Cab. 2
Diluted exhaust 2 (Dirty)	Bag Cab. 2	Bag Cab. 1	Bag Cab. 1	Bag Cab. 2

1.2.1.3 CVS SL MFC BAG FILLING MONITORING

No further technical information

1.2.1.4 CVS SL VENTURI 2M³/MIN

No further technical information

1.2.1.5 CVS SL VENTURI 4M³/MIN

No further technical information

1.2.1.6 CVS SL VENTURI 8 M3/MIN

No further technical information

1.2.1.7 CVS SL VENTURI 16 M3/MIN

No further technical information

1.2.1.8 CVS SL BLOWER 30M3

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General system specifications	
Material	Steel
Max. flow rate	30 m³/min (@ 1,013hPa, 0°C)
Dimensions (WxHxD)	700x800x650 mm
Weight	Approx. 100 kg
Electrical connection	400/480 VAC +/-10%, 3/N/PE, 50/60 Hz
Power consumption	15 kVA
Protection class	IP55

1.2.1.9 CVS LD SILENCER FOR UP TO 40 M3/MIN

General Specifications	
Dimensions (WxHxD)	Length: 1165 mm, Outer diameter: 220 mm, Inner diameter: 154 mm, (flange-less tube connection)
Weight	approx. 80 kg
Material	Steel, aluminum white coated
CVS blower outlet sound level reduction:	Approx. 10 dB(A) per silencer

Note
For installation in residental enviroment/area silencer with higher sound level reduction is available on request.

1.2.1.10 CVS LD BLOWER SOUND PROTECTION HOOD

General Specifications	
Dimension (WxHxD)	900 x 900 x 900 mm
Weight	Approx. 80 kg
Material	Steel sheet with sound proofing
Sound pressure level (CVS Blower Body Sound)	85 dB(A) at a distance of 1 meter

1.2.2 CVS SL CVS SL BLOWER EXTENSIONS

1.2.2.1 CVS SL BLOWER 30M3

For the technical details please refer to pos 1.2.1.8

1.2.2.2 CVS LD SILENCER FOR UP TO 40 M3/MIN

For the technical details please refer to pos 1.2.1.9

1.2.2.3 CVS LD BLOWER SOUND PROTECTION HOOD

For the technical details please refer to pos 1.2.1.10

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1.2.3 CVS SL LD DILUTION AIR PREPARATION

1.2.3.1 VTi 2-STAGE DILUTION AIR FILTER

General Specifications	
Dimensions (W x H x D)	680 x 950 x 680 mm / 26.77 x 37.40 x 26.77 inch
Weight (depends on configuration)	approx. 60 kg / 132.28 lbs
Power supply	230 VAC (N/PE) ± 10 %, 50 Hz ± 2 %
Permissible ambient temperature	+5 °C … +40 °C / 41 °F … 104 °F
Permissible ambient pressure	900 … 1,100 hPa abs. / 13.05 … 15.95 psi abs.
Permissible operating altitude	2,000 m (with reduced flow rate)
CVS flow rate	max. 40 m3/min
1st stage filter	Coarse filter
2nd stage filter	HEPA filter class 14 (H14 HEPA filter), 99.97% efficiency

Note:
- An additional combined coarse and activated charcoal filter and dilution air heater are optionally available.

1.2.3.2 RMU/VTI ACTIVATED CHARCOAL FILTER

Provide a 3-stage-filter (Combined coarse /charcoal and fine filter) instead a 2-stage-filter (coarse and fine filter).

General Specifications	
Dimensions	630 x 150 x 630 mm / 24.8 x 5.91 x 24.8 inch
Weight	8 kg / 17.64 lbs
Filter material	Activated carbon and coarse filter
Cut-off efficiency	Up to 97% (depending on type of VOC)
Max. temperature	70°C

1.2.3.3 CVS LD DILUTION AIR HEATER 18 KW

It contains one heating element and a temperature control unit with a sensor. The dilution air temperature can be set via iGEM CVS software or by AK interface though an automation system.

General Specifications	
Dimensions – Heating module (WxHxD)	680 x 296 x 680 mm / 26.77 x 11.65 x 26.77 inch
Dimensions – Control module (WxHxD)	600 x 210 x 600 mm / 23.62 x 8.27 x 23.62 inch
Power supply	400 VAC ± 10% - 3/N/PE 50/60 Hz ± 2%
Power consumption	18 kVA
Permissible ambient temperature	5 °C to +40 °C / 41 °F to 104 °F
Permissible ambient pressure	700 – 1,100 hPa abs. / 10.15 – 15.95 psi abs.
Power consumption	2,000 m (with reduced flow rate)
Heating power, dT	25 K @ 30 m^3/min 20 K @ 40 m^3/min

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Note:
- Not recommended for using in climatic chamber application. For climatic chamber application another heating element available.

1.2.3.4 TPC LD VTI MODULAR

The tile pipe pressure control (TPC) blower I usually installed downstream of the VTi dilution air filter and upstream of the optionally AVL Flowsonix dilution air flow measurement device. It is fully integrated into the iGEM CVS control software via CAN-Bus communication.

General Specifications	
Dimensions (WxHxD)	approx. 964 x 900 x 900 mm / approx. 37.95 x 35.43 x 35.43 inch
Weight	approx. 120 kg / 264.55 lbs
Power supply	400 VAC (N/PE) ± 10 %, 50/60 Hz ± 2 %
Permissible ambient temperature	+5 °C to +40 °C / 41 °F to 104 °F
Permissible ambient pressure	700 – 1,100 hPa abs. / 10.15 – 15.95 psi abs.
Permissible operating altitude	2,000 m (with reduced flow rate)
CVS flow rate	max. 40 m³/min
Dimensions	ca. 964 x 900 x 900 mm (wxhxd)
Booster blower	PID - controlled up to 30m³/min
Booster blower power consumption	approx. 1 kVA
Pressure control accuracy	±2.5 hPa ≤ 2s

1.2.3.5 VTI200 CONN.TUBE AIR FILTER – TUNNEL

General Specifications	
Dimensions	Diameter (ID): 200 mm Length: 524 mm
Material	Stainless steel

1.2.4 CVS SL LD TUNNEL & PIPING

1.2.4.1 CVS LD EXHAUST PIPE ADAPTER

General Specifications	
Material	Silicone
Max. Temperature	200 °C
Diameters of each piece	30mm – 38mm 38mm – 45mm 45mm – 51mm 51mm – 57mm 57mm – 63mm 63mm – 70mm

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1.2.4.2 HEATED FLEX. EXHAUST TUBE GTR15-3M

General Specifications	
Material	Inner: Metalized inner core Outer: Heating element including insulation 25 mm
Thermal conduction coefficient	< 0.1 W/mK @400°C
Max. operating temperature	450°C (Maintained temperature at 120 °C)
Max. bending radius	Approx. 650 mm
Power Supply	230 VAC (N/PE) ± 10 %, 50 Hz ± 2 %
Power Consumption	Approx. 1500 W
Dimensions	Length: 3000 mm Exterior diameter: approx. 200 mm Inner diameter: 90 mm
Weight	Approx. 16.25 kg
Possible connecting flange	2½“ tube or fly-flange ISO DN80 or tanker coupling VK/MK80

1.2.4.3 VTi LD MIXING POINT FIX

General Specifications	
Dimensions and weight	Depends on project
CVS flow rate	max. 40 m3/min
Connection – dilution air inlet	Diameter: 200 mm
Connection – raw exhaust inlet	Diameter: 80 mm
Connection – diluted exhaust outlet	Diameter: 200 mm

1.2.4.4 VTI200 DILUTION TUNNEL WO ELECTROPOLISH

At the end of the dilution tunnel are connectors for probes for continuous diluted THC (Tunnel FID), a Particulate Sampler, a Particle Counter, and a Micro Soot Sensor.

General Specifications	
Dimensions of the dilution tunnel	Diameter: 200 mm Length: 2300 mm
Reynolds number	>4000
Weight	Approx. 40 kg
Material	Stainless steel
Connecting flange	Straub coupling

1.2.4.5 CVS TCU STAND-ALONE MODULE (PT100) 100-120V

The TCU Stand Alone Cabinet contains CAN-Bus cable with the length of 15 meters, one power supply cable and integration into the iGEM CVS device software.

General Specifications	
Dimensions	600 mm x 600 mm x 300 mm
Power supply	100 - 120 VAC (N/PE) ± 10 %, 50 Hz ± 2 %
Power consumption	max. 3.6 kW per TCU

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Fuse protection of the heating circuit	2 x 4 A, 1 x 8 A, 1 x 12 A (per TCU)
Number of heating circuits	4 per TCU
Temperature sensor type	PT100
Permissible ambient temperature	+5 °C to +40 °C / 41 °F to 104 °F
Air humidity	max. 80% rel.
Cabinet protection class	IP63

1.2.4.6 CVS PIPE UP TO 5M

General Specifications	
Dimensions	Diameter: 200 mm Length: up to 5000 mm
Weight	Approx. 18 kg/m
Material	Stainless steel
Connecting flange	Straub coupling

Note:
- Numbers of elbows and straight parts will vary depend on the specific layout.

1.2.4.7 CVS PIPE INSULATION UP TO 5M

No further technical information

1.2.4.8 DIL.EXHAUST RISER TUBE W/O ELECTROPOLISH

No further technical information

1.2.4.9 90° ELBOW INLET TUBE W/O ELECTROPOLISH

No further technical information

1.2.5 DISCOUNT FOR USED SYSTEM - CVS SL (GU1207)
TE6BSE.00

1.2.5.1 DISCOUNT FOR USED SYSTEM - CVS SL

For the technical details please refer to pos 1.1.3.1

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1.3.1 PSS SL SD

1.3.1.1 PSS SL SD BASIC UNIT W/O IPC

General Specifications	
Dimensions (WxHxD)	668 x 1,970 x 297 mm / 26.3 x 77.56 x 11.69 inch
Total weight	approx. 200 kg / 441 lb
Power supply	100 - 400 VAC (N/PE) ± 10%; 50/60 Hz ± 2% (From customer connection point to AVL PSS cabinet)
Internal power supply	24 V / 48 V DC
Power consumption	Approx. 1.5 kVA
Permissible ambient temperature	+15°C … +40°C / 59°F … 104°F
Permissible relative humidity	Max. 80%, non-condensing
Permissible ambient pressure	900 … 1100 hPa abs. / 13.05 … 15.95 psi abs.
Permissible operating altitude	500 meter above sea level (Optional up to 2,000 meters with reduced flow rate)
Background noise	< 60 dB (A)
Material (of gas leading components)	Stainless steel, PFA (tubes), Viton (seals)
Interfaces	LAN TCP/IP, RS232 (AK protocol)
No. particulate filter holder	Max. 4
PSS flow rates	Max. 70 l/min
Sampling probes design	Stainless steel with hat
Sample temperature	47 °C ± 5 °C / 116.6 °F ± 9 °F
Filter phase switching functionality	Yes
Mass Flow controller	Yes
Flow control accuracy	±1.5 % of selected flow rate
Pressured air connection	5 … 7 bar abs. / 72.5 … 101.5 psi abs.; oil and particle free (Connection from CVS SL)

- For further details please refer to the specific data sheet.
- The total resident time shall be calculated according to the final installation specific layout.

Basic functionality of the iGEM PSS bench control software:
- Standby / Pause / Gasoline or Diesel / Load filter
- Leak check (System leak check and Line leak check)
- MFC calibration
- Sensor calibration
- Online data trend chart module for visualization and recording the data of the iGEM PSS SW

Note:
- Particulate filter holders and filter elements must be considered separately.

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1.3.1.2 PSS PART. FIL. HOLDER 1X47MM

The single stage particulate filter holder with filter puck is for filter media with a circular shape and an outer diameter of 47 mm and provides a stain area with a diameter of 38 mm. An RFID ring is included in order to support automated weighing of filter media with a robotic filter weighing system.

General Specifications	
Filter media diameter	47 mm
Stain area diameter	38 mm
Weight	approx. 0.5 kg
Connection	Quick connectors

1.3.2 DISCOUNT FOR USED SYSTEM - PSS SL (GU1208)
TE6BSE.00

1.3.2.1 DISCOUNT FOR USED SYSTEM - PSS SL

For the technical details please refer to pos 1.1.3.1

1.4.1 NEW iGEM DEVICE SW PACKAGE

1.4.1.1 IGEM AMA MULTI CONFIGURATION AMA/CVS/PSS

No further technical information

1.4.1.2 iGEM AMA 1066 AND EU 6 LD SW EXT.PACKAGE

This package includes the following check functions according to the listed CFR 1065/1066 paragraphs:

1066.130 -> 1065.305	Verification for accuracy, repeatability, and noise (ANR Check)
1066.130 -> 1065.307	Analyzer linearity verification
*1065.307	Gas divider verification
1066.130 -> 1065.308	Continuous gas analyzer system-response and updating-recording verification
1066.130 (Table 1) -> 1065.345 (d)	Leak verification by dilution of span gas (overflow valves required)
1066.130 (Table 1) -> 1065.345 (e)	Leak verification by vacuum decay
1065.350	H2O interference verification for CO2 NDIR analyzers
1065.355	H2O and CO2 interference verification for CO NDIR analyzers
1065.360	FID optimization and verification (analyzer feature)
1065.362	Non-stoichiometric raw exhaust FID O2 interference verification
1065.365	Nonmethane cutter penetration fractions
1065.370	CLD CO2 und H2O quench check
1065.378	NO2 to NO converter conversion check
1065.520f	Hydrocarbon contamination verification (Hang-Up)

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This package includes the following check functions according to the listed EU 6 and CHINA 6 paragraphs:

Analyzer linearity verification	EU: Annex XXI - Sub Annex 5 - 5.2 China 6: Annex CD - 5.2
System response time check (required for HFID)	EU: Annex XXI - Sub Annex 5 - 4.1.3.1.5. China: Annex CD - 4.1.3.1.5
NOx converter check	EU: Annex XXI - Sub Annex 5 - 5.5 China 6: Annex CD - 5.5
HC response factor check	EU: Annex XXI - Sub Annex 5 - 5.4.3 China 6: Annex CD - 5.4
Cutter efficiency check for Ethane and Methane	EU: Annex XXI - Sub Annex 5 – 5.1 -Table A5/3 (limit) EU: Annex XXI - Sub Annex 7 - 3.2.1.1.3.3. (procedure) China 6: Annex CD - 5.1 - Table CD.3 (limits) China 6: Annex CE - 3.2.1.1.3.3. (procedure)
Cross-sensitivity of CO analyzer	EU: Annex XXI - Sub Annex 5 - 5.1 - Table A5/3 (limit) China 6: Annex CD - 5.1 - Table CD.3 (limits)

Where different limits are applicable for the previous ECE/EPA and EPA 1066 / Euro 6d legislation, checks can be performed according to one or the other legislation. On request the number of digits of the AK string can be switched to a higher number. Switching to 1066 mode is also available through the AK interface (ECFR/ACFR). 1066 specific parameters need to be selected in the check parameters in the iGEM AMA user interface.

Note

- The scope of supply does not include any maybe necessary additional hardware.

1.4.1.3 IGEM AMA QUALITY CENTER

Web-based history and statistical data evaluation:

- Provides evaluation over many calibration cycles or checks and offers statistical information about an analyzer.
- The following statistical data evaluation functions are available both for the Online History and the Offline History:
  - Calibration history: evaluation of past calibrations
  - Device life cycle: shows the total times an analyzer was in different states (e.g., MEASURE, PURGE, ON or OFF) and when firmware and driver were updated
  - Check history evaluation: evaluation of the history of various checks: ANR check, CLD quench check, CO cross check, NOx converter check, H_2O rejection ratio check, hang-up check, O_2 interference check.
  - Possibility to create your own evaluations.

Monitoring:

- Allows to record certain values such as concentrations, temperatures, etc. when defined conditions are fulfilled, e.g. status change, limit violation, error. The graphical display is realized via iTrend.

1.4.1.4 iGEM CVS 1066 AND EU 6 LD SW EXT.PACKAGE

This package includes the following check functions according to the listed 1066 paragraphs:

§1066.135(c)(d)	MFC check and sensor calibration
§1066.140(h) -> §1065.340(h)	LFE calibration
§1066.130 -> §1065.345e	Leak check vacuum

In addition, the following check functions according to the Commission regulation (EU) 2017/1151 Annex XXI – Sub Annex 5 are included:

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3.2.4	Leak check vacuum
3.3.5	Sensor calibration
3.4.3	LFE calibration

Where different limits are applicable for the previous ECE/EPA and EPA 1066 / Euro 6d legislation, checks can be performed according to one or the other legislation. On request the number of digits of the AK string can be switched to a higher number. Switching to 1066 mode is also available through the AK interface (ECFR/ACFR). 1066 specific parameters need to be selected in the check parameters in the iGEM CVS user interface.

Note
- The scope of supply does not include any maybe necessary additional hardware.

1.4.1.5 iGEM PSS 1066 AND EU 6 LD SW EXT.PACKAGE

This package includes the following check functions according to the listed CFR 1066 paragraphs:

§1066.135(b)(c)	MFC check and sensor calibration
§1066.130 -> §1065.345e	Leak check vacuum

In addition, the following check function according to the Commission regulation (EU) 2017/1151 Annex XXI – Sub Annex 5 are included:

3.2.4	Vacuum leak checks
3.3.5	MFC check and sensor calibration

Where different limits are applicable for the previous ECE/EPA and EPA 1066 / Euro 6d legislation, checks can be performed according to one or the other legislation. On request the number of digits of the AK string can be switched to a higher number. Switching to 1066 mode is also available through the AK interface (ECFR/ACFR). 1066 specific parameters need to be selected in the check parameters in the iGEM PSS user interface.

Note
- The scope of supply does not include any maybe necessary additional hardware.

1.4.2 NEW HARDWARE

1.4.2.1 NEW INSTALLATION MATERIAL DILUTE

For the technical details please refer to pos 1.1.3.1

1.4.2.2 RMU/VTi HEATING MIXING POINT

General Specifications	
Power supply	230 VAC (N/PE) ± 10 %, 50 Hz ± 2 %
Power consumption	1200 W

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1.4.2.3 PSS i60 FILTER HOLDER TRANSPORT BOX

No further technical information

1.5.1 ICAL CALIBRATION AND TEST EQUIPMENT

1.5.1.1 ICAL CFO i60 LE BASIC UNIT 100-120V

General Specifications	
Selectable flow rate	50 … 430 ml/min
Input gas	Pure Propane – C_3H_8 (Optional CO)
Input pressure	Max. 10 bars (145 psi)
Max. back pressure	0 … 250 mbar rel. (3.63 psi)
Stabilization time	Approx. 40 s
Dynamic range of output flow rate	1:4 (Propane)
Supply pressure to nozzle	2.07 … 3.45 bar (30 … 50 psi), adjustable with motor-driven pressure regulator, measured with absolute pressure sensor
Pressure measurement sensor	0 … 10.34 bar (0 … 150 psi) precision ± 0.05% of reading, with software calibration
Temperature measurement sensor	With PT100, precision ± 0.1°C, with software calibration
Precision of flow rate	± 0.3 % of selected flow rate
NIST Traceable	Yes
Interface	RS232, V24, TCP/IP, AK protocol
Ambient conditions	5 … 35 °C (41 … 95 °F), 80 % rel. humidity
Power	100 - 120 VAC +/-10 %, 50/60 Hz
Gas connection	6 mm Swagelok

1.5.1.2 ICAL GNU SL EXT. GDU / NGU 63 STEPS

General Specifications	
Gas Divider Principle	6 sonic nozzles
Ozone Generator Principle	Corona Discharge
Dimensions	476 mm x 285 mm x 176 mm 18.74 inch x 11.22 inch x 6.93 inch
Weight	Approx. 11 kg / 124,25 lb
Power Supply	24 VDC +/- 10%
Power Consumption	Max. 75 VA
Permissible Ambient Temperature	5 – 45 °C / 41 – 113 °F
Cut Points	63 cut points (+zero step) between 0 and 100 %
Inlet Pressure	2,800 hPa rel. – 3,800 hPa rel. 40.61 psi rel. – 55.11 psi rel.
Outlet Pressure	Max. 1,500 hPa abs. / 21.76 psi abs.
Total Flow Rate	3.5 ± 0.5 l/min (N_2 at 1,013 hPa / 20 °C / 14.69 psi / 68 °F)
Calibration	By highly precise laminar flow element (LFE) Re-calibration required every 12 months
Measurement uncertainty (flow) acc. to ISO 17025	< 0.35 %
Accuracy	< 0.49 % of the selected dilution step

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Reproducibility	< 0.3 % rel.
Stabilization Time	Approx. 20 sec. (gas divider), approx 60 sec. (converter checker)
Required Operation Gases	Span gas: all clean, dry and not highly corrosive gases or gas mixtures Zero gas 1: nitrogen N_2 Zero gas 2: synthetic air
Converter checker: NO_2 concentration range	30 - 1,000 ppm (with oxygen)
Interfaces	TCP/IP, RS 232 (VDA-AK SAMT), USB

1.6.1 AVL PROJECT MANAGEMENT & ENGINEERING

1.6.1.1 AVL PROJECT MANAGEMENT - CUSTOMER PROJECT (w. travel)

AVL Project Management (Customer Project) includes the following tasks:
- Project support from kick-off to final acceptance of the system.
- The project manager is responsible for project management, scheduling, and resource planning in the project.
- Coordination of the services included in the scope of supply.
- Provide rapid support on all technical and procedural issues.
- Clarification of required responsibilities.
- Professional selection and management of external suppliers and subcontractors.
- The project manager attends project meetings via teleconferencing (usually) and on-site and prepare required reports and reviews.

Unusual issues are proactively addressed by the Project Manager and turned into efficient solutions.

Note
- If necessary, interpreters (except for German and English) must be provided by the customer.
- Costs are calculated for expected effort. Unexpected expenses that are not the responsibility of AVL may be charged separately.
- Travel expenses for up to four (4) days on-site visits (max. three (3) travels) include. Requested additional travel(s) will be charged separately.

1.6.1.2 AVL AAT PROJECT MANAGEMENT

The Specialized Project Manager (PjM-s) for Order Fulfillment is responsible for the following tasks:
- Point of contact for the PjM for all project content, from signing the project to acceptance.
- Supporting the PjM in all technical or procedural matters.
- Participating in the project meetings via teleconferencing and preparing of required reports and reviews (if required).
- Internal project schedule, and resource planning
- Project tracking and coordination and development of flowcharts, concepts, and proposed solutions for project execution.
- Provide goal-oriented leadership to project staff.
- Resolve unusual problems in the project and coordinate the problem-solving process when variances occur.

Notes
- Interpreters (except for German and English), must be provided by the customer, if necessary.
- Costs are calculated for expected effort. Unexpected effort which are not under responsibility of AVL can be charged separately.
- Possible travel and accommodation expenses are listed in a separate article

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1.6.1.3 AVL AAT PROJECT ENGINEERING

The System Engineering contains the following tasks:
- Creation of test bed layouts and constructions drawings
- Creation of overview drawings
- Specification of interfaces and supply lines
- Creation of project specific documentation
- Creation of customer specific solutions

Prerequisites:
- The following is required for planning and must be provided by the customer:
- Building data with at least 2D drawing
- Interfering contours in the building
- Pictures of the premises where the AVL systems are to be installed.
- If possible, bearing capacity of walls/ceilings.

Notes
- Interpreters (except for German and English), if necessary, must be provided by the customer.
- Costs are calculated for expected effort. Unexpected effort which are not under responsibility of AVL can be charged separately.
- Possible travel and accommodation expenses are listed in a separate article

1.6.1.4 AVL DOCUMENTATION AND SOFTWARE CHANGE

Note
- It does not cover any modifications that may be required in the automation or host system.

1.6.2 DISASSEMBLING & PACKING SL DILUTE

1.6.2.1 AVL LABOR ON SITE - PRE-CHECK SL DILUTE

Notes
- Travel and accommodation expenses for the AVL employee(s) will be charged separately.
- Interpreters (except for German and English), if required, must be provided by the customer.
- Additional demands, for reasons which AVL is not accountable, will be charged separately if necessary.

1.6.2.2 AVL LABOR ON SITE - DISASSEMBLING SL DILUTE

Notes
- Travel and accommodation expenses for the AVL employee(s) are listed in a separate article.
- Interpreters (except for German and English), if required, must be provided by the customer.
- Additional demands, for reasons which AVL is not accountable, will be charged separately if necessary.

1.6.2.3 TRAVEL EXPENSES DISASSEMBLING DILUTE

Travel expenses content
- Expenses for journey (flights, train, etc.)
- Accommodation cost
- Daily allowance

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- Daily Transportation (Hotel <-> Customer)

Note
- Any additional demands made for reasons for which AVL is not responsible will be invoiced separately.

1.6.2.4 PACKING MATERIAL & SHIPPING

The packing has been designed to ensure the immaculate operation of the shipped equipment at its destination. The packaging may vary depending on the type of transportation and the destination.
The shipping includes the costs according of offered INCOTERMS 2020 and mode of dispatch.

1.6.3 AVL DEVICE INSTALLATION

1.6.3.1 AMA SL INSTALLATION - 1 STREAM

The installation contains the assembly of all AMA SL™ system components and connecting to predefined interfaces including all necessary utilities for operation of the device.

Note:
- Internal transportation at customer site including moving/placing the system into its final location e.g. the test cell or measuring room is not included.
- All preconditions are the customer is responsibility for, must be completely fulfilled before beginning installation work. These are, e.g. completely finalized construction work within the designated area, clean swept environment with properly working heating and air conditioning. Undisturbed supply of pressurized air, calibration-, test-, purge- and operation gases, power supply and a properly working exhaust ventilation system according to system specifications must be available.
- Strict observation of general and local security standards to avoid accidents is a basic requirement for the start of the installation work.
- Travel and accommodation expenses are listed in a separate article.
- Interpreters (except for German and English), if necessary, must be provided by the customer.
- Additional time spent due missing pre-requisites mentioned above or subsequent request from customer will be invoiced at cost.

1.6.3.2 AMA SL COMM. & FAT - 1 STREAM - BASIC

The installation of the system must be completely finalized as prerequisite for the commissioning work.
The final acceptance will take place right after the commissioning of the AMA SL. For further details please refer to the AVL Final Acceptance Procedure

Note:
- Calibration- and test equipment, e.g. gas divider, are not scope of the supply and must be considered separately or to be provided and operated by the customer.
- The commissioning engineer will not prove engine test results, however the correctness of function and calibration of the delivered system.
- Strict observation of general and local security standards to avoid accidents is a basic requirement for the start of the commission work.
- Travel and accommodation expenses are listed in a separate article.
- Interpreters (except for German and English), if necessary, must be provided by the customer.
- Additional time spent due missing pre-requisites mentioned above or subsequent request from customer will be invoiced at cost.

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1.6.3.3 CVS SL INSTALLATION

The installation contains the assembly of all CVS SL LD system components and connecting to predefined interfaces including all necessary utilities for operation of the device.

Note:
- Internal transportation at customer site including moving/placing the system into its final location e.g. the test cell or measuring room is not included.
- All preconditions are the customer is responsibility for, must be completely fulfilled before beginning installation work. These are, e.g. completely finalized construction work within the designated area, clean swept environment with properly working heating and air conditioning. Undisturbed supply of pressurized air, calibration-, test-, purge- and operation gases, power supply and a properly working exhaust ventilation system according to system specifications must be available.
- Strict observation of general and local security standards to avoid accidents is a basic requirement for the start of installation work.
- Travel and accommodation expenses are listed in a separate article.
- Interpreters (except for German and English), if necessary, must be provided by the customer.
- Additional time spent due missing pre-requisites mentioned above or subsequent request from customer will be invoiced at cost.

1.6.3.4 CVS SL COMMISSIONING & FAT - BASIC

The installation of the system must be completely finalized as prerequisite for the commissioning work.
The final acceptance will take place right after the commissioning of the CVS SL. For further details please refer to the AVL Final Acceptance Procedure

Note:
- Calibration- and test equipment, e.g. CFO checker, are not scope of the supply and must be considered separately or to be provided and operated by the customer.
- The commissioning engineer will not prove engine test results, however the correctness of function and calibration of the delivered system.
- Strict observation of general and local security standards to avoid accidents is a basic requirement for the start of the commission work.
- Travel and accommodation expenses are listed in a separate article.
- Interpreters (except for German and English), if necessary, must be provided by the customer.
- Additional time spent due missing pre-requisites mentioned above or subsequent request from customer will be invoiced at cost.

1.6.3.5 PSS SL INSTALLATION

The installation contains the assembly of all PSS SL™ system components and connecting to predefined interfaces including all necessary utilities for operation of the device.

Note:
- Internal transportation at customer site including moving/placing the system into its final location e.g. the test cell or measuring room is not included.
- All preconditions are the customer is responsibility for, must be completely fulfilled before beginning installation work. These are, e.g. completely finalized construction work within the designated area, clean swept environment with properly working heating and air conditioning. Undisturbed supply of pressurized air, calibration-, test-, purge- and operation gases, power supply and a properly working exhaust ventilation system according to system specifications must be available.
- Strict observation of general and local security standards to avoid accidents is a basic requirement for the start of installation work.
- Travel and accommodation expenses are listed in a separate article.
- Interpreters (except for German and English), if necessary, must be provided by the customer.

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- Additional time spent due missing pre-requisites mentioned above or subsequent request from customer will be invoiced at cost.

1.6.3.6 PSS SL COMM. & FAT

The installation of the system must be completely finalized as prerequisite for the commissioning work. The final acceptance will take place right after the commissioning of the PSS SL. For further details please refer to the AVL Final Acceptance Procedure

Note:
- Calibration- and test equipment, e.g. MFC calibration unit, are not scope of the supply and must be considered separately or to be provided and operated by the customer.
- The commissioning engineer will not prove engine test results, however the correctness of function and calibration of the delivered system.
- Strict observation of general and local security standards to avoid accidents is a basic requirement for the start of the commission work.
- Travel and accommodation expenses are listed in a separate article.
- Interpreters (except for German and English), if necessary, must be provided by the customer.
- Additional time spent due missing pre-requisites mentioned above or subsequent request from customer will be invoiced at cost.

1.6.3.7 VTi LD INSTALLATION

The installation contains the assembly of all VTi Light Duty (LD) system components and connecting to predefined interfaces including all necessary utilities for operation of the device.

Note:
- Internal transportation at customer site including moving/placing the system into its final location e.g. the test cell or measuring room is not included.
- All preconditions are the customer is responsibility for, must be completely fulfilled before beginning installation work. These are, e.g. completely finalized construction work within the designated area, clean swept environment with properly working heating and air conditioning. Undisturbed supply of pressurized air, power supply and a properly working exhaust ventilation system according to system specifications must be available.
- Strict observation of general and local security standards to avoid accidents is a basic requirement for the start of installation work.
- Travel and accommodation expenses are listed in a separate article.
- Interpreters (except for German and English), if necessary, must be provided by the customer.
- Additional time spent due missing pre-requisites mentioned above or subsequent request from customer will be invoiced at cost.

1.6.3.8 TRAVEL EXPENSES INST. & COMM.

For the technical details please refer to pos 1.6.2.3

2.1.1 IGEM 2 VEHICLE SOFTWARE LICENCES

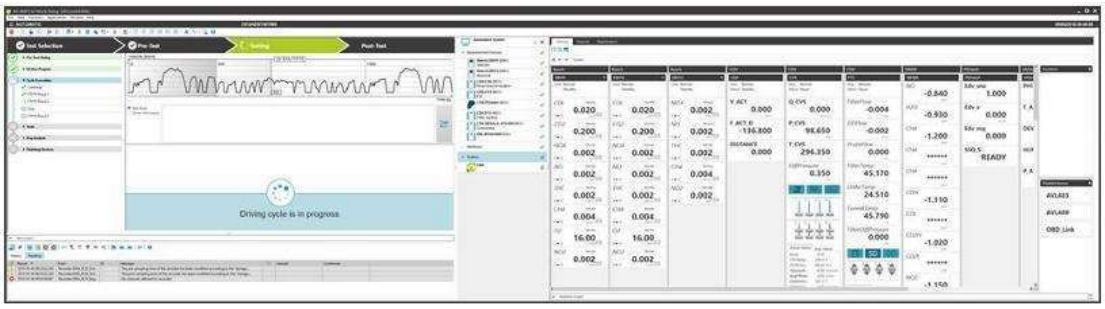
2.1.1.1 IGEM 2 FOR VEHICLE TESTING

The application features are tailored to certification testing, conformity of production (COP) as well as R&D testing.

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iGEM 2 screen shot - for illustration purposes only

Parameterization
The parameterization of test procedures is based on a modular function library system. Test cycles can be configured via an intuitive graphical user interface. The combination of cycle definition, device control commands, emission limits and procedure settings into powerful parameter blocks allow the fast and easy creation of new test procedures.

Automation
AVL iGEM 2™ for Vehicle Testing is designed to execute fully automated device and vehicle related procedures based on the pre-test dialog settings. The execution of the procedures is optimized for efficiency and reliability, based on AVL's decades of experience in emission and alternative energy powered vehicle testing. A strong focus is set on the most efficient utilization of the testbed resources during test execution. The open design of the application allows the re-use of components for other application tasks.

Web Based Driver's Aid
The AVL Testbed Driver's Aid is a web-based software to guide the driver through a test cycle. Because of the web-based design, the graphical user interface can be opened in multiple web browsers at the same time. This technology has the advantage that it does not need an additional PC besides the automation system PC, and it allows to show the same screen as the driver sees, in i.e. operator room. The driver's aid is controlled by default by a 4-button wireless remote control. As an alternative, it can be ordered on a tablet PC for portable touch operation.

Device Control
The AVL iGEM 2™ Test Cycle allows the definition of generic commands for device groups without the need of knowledge about the individual device interfaces.

Test Results
The AVL iGEM 2™ Data Model is designed to allow full traceability and confidence in legislative testing in a structured and open manner. Whether it is measurement device information or recorded results - one always knows how the test has been performed in detail.

Coast Down (Roadload Derivation)
The chassis dyno coast down as well as the quick check is expected to be executed by the chassis dyno controller. Determined roadload coefficients can be entered in the iGEM 2™ for Vehicle Testing parameter editor.

2.1.1.2 iGEM 2 DILUTE DEVICE CONTROL MODULE

The AVL iGEM 2™ Device Control Module for dilute measurements distributes commands between the AVL iGEM 2 Test Cycle and the individual devices in the diluted exhaust gas stream. To control the devices AVL iGEM 2 utilizes the standardized device abstraction interfaces (DAL) of the AVL PUMA 2™ automation platform.

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2.1.1.3 iGEM 2 CALIBRATION AND DEVICE CHECKS

To control the device calibrations AVL iGEM 2™ utilizes the standardized device abstraction interfaces (DAL) of the AVL PUMA 2™ automation platform.

AVL iGEM 2 for Calibration and Device Checks supports the following functions and checks for below listed devices. Prerequisite that the device also supports the functionality over their remote interface.

Function	Devices
• Calibration • Drift check • Hang-up check	Gaseous measurement devices
Internal leak check	• Gaseous measurement devices • Micro Soot Sensors • Opacimeters • Particulate counting devices • Partial flow dilution systems • Smoke meters

2.1.1.4 IGEM 2 DATA PROCESS. TOOLBOX TESTBED NL

Note
- This toolbox is provided as a Node Locked license.

2.1.2 AVL CONCERTO 5 EXTENSION

2.1.2.1 ASAM WRITE (COMPOSER) OPTION NL

No further technical information

2.1.2.2 CONCERTO ADK LIZENZ NL

For the technical details please refer to pos 1.1.3.1

2.1.3 IGEM 2 VEHICLE HARDWARE (Typical)

2.1.3.1 iGEM 2 FOR VEHICLE TESTING BASE SYSTEM 20HU

The standard power plug is a 230V. Any other power supply is available by request.

Cabinet hardware typical configuration*1)
- 1x 19” 20 HU System Cabinet
- 1x Testbed Workstation TWS A5 (4 HU), WIN10 PRO or LTSC (WIN11 on request)
- 2x Operator Room 24” TFT Monitors
- 1x F-FEM-CON (input/output module for control and monitoring of UUT and dyno)
- 1x FIREWIRE CARD
- 1x USB KEYBOARD CHERRY KC1000
- 1x OPTICAL WHEEL MOUSE USB UND PS/2
- 1x ACTIVE USB HUB 4-PORT
- 1x Network Adapter INTEL PRO/1000 CT DUAL (2 ethernet slots)

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- 1x 24-PORT GIGABIT UNMANAGED SWITCH TP-LINK
- 1x iGEM 2 UPS (2 HU) 1,500 VA / 1,000 W (Buffer capacity approx. 10 min)

*1) subject to change w/o notice

Note

- The iGEM 2 trolley provides limited space, it might be necessary to store additional hardware (e.g. I/O Box) in a separate cabinet (e.g. wall box) or change to the large cabinet.

2.1.3.2 AVL TESTBED DRIVERS AID 12 HU TROLLEY

The AVL Testbed Driver's Aid Trolley is compatible with the AVL Testbed Remote Control for Driver's Aid. Actions like test start/stop or dyno control functions can be controlled via that remote control, available as separate article. A customizable section of the screen shows live recordings of selected channels.

General Specifications	
Trolley	Movable 19" rack mount unit
Hight	12 height units
Display	21,5'' Display
Temperature range	+10 …+35 °C

2.1.3.3 AVL TESTBED DRIVERS AID REMOTE CONTROL

The Driver's Aid Remote Control article provide the Remote Control and a Receiver Unit.

Remote Control	
Article Number	PN-T21-4
Frequency	2,4 GHz 16 channels
Weight	140 g
Temperature Range	-20 … +55°C
Certificates	CE, FCC, IC
Battery	changeable
Safety Class	IP67
Dimension	~ 65 x 112 x 35 mm
Receiver Unit	
Article Number	PN-R8-1
Frequency	2,4 GHz 16 channels
Power supply	12-24 V DC
Safety class	IP66
Certificates	CE, EMARK
Weight	400 g
Dimension	~ 120 x 116 x 50 mm
Temperature Range	-20 … +55°C

- The integration of the receiver unit to an automation system requires 4x D-IN (IO) channels.

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2.1.3.4 IGEM 2 WEATHER STATION INDIGO 520

VAISALA INDIGO 520	
Interface	Modbus TCP
Output	4 x Analog Out
Barometric pressure sensor (Class A)	
Pressure range	500 ... 1100 hPa
Linearity	±0.05 hPa
Hysteresis	±0.03 hPa
Repeatability	±0.03 hPa
Calibration uncertainty	±0.07 hPa
Accuracy at +20°C/ +68°F	±0.10 hPa
Temperature dependence	±0.1 hPa
Total accuracy (-40 ... +60 °C / -40 ... +140°F)	±0.15 hPa
Long-term stability/year	±0.1 hPa
Response time (100% response)	2 s
Pressure units	hPa, mbar, kPa, Pa, inHg, mmH20, mmHg, torr, psia
Operating humidity range	
Measuring range	0 ... 100 % rF
Accuracy at +23°C *1)	±0,8 % rF (0 ... 90 % rF)
Uncertainty of the factory calibration *2)	±0,5 % rF (0 ... 40 % rF) ±0,8 % rF (0 ... 95 % rF)
T_{63}-response time	15 s
Sensor options	HUMICAP® R2 HUMICAP® R2C *3) HUMICAP® 180VC *3)
Temperature	
Sensor	Pt100 RTD Class F0.1 IEC 60751
Measuring range	-40 ... +120 °C
Accuracy *1)	±0,1°C
Uncertainty of the factory calibration *2)	±0,1°C @ +23 °C

*1) Related to calibration reference. Includes non-linearity, hysteresis, and repeatability.
*2) Defined as ±2 standard deviation limits. Subject to change without notice, refer to calibration certificate.
*3) Sensor cleaning function available for this sensor.

2.1.3.5 AVL TESTBED OBD LINK HW

Content
- 1 OBD Link SX Adapter
- 1 Active USB extension 15m

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AVL Testbed OBD Link Adapter & USB extension cable – for illustration purposes only

OBD interface hardware – passenger cars	
Operating data:	current 8 mA, power saving mode < 1 mA, voltage 8 to 18V DC
Operating environment:	temperature -20 °C to 55 °C humidity 10% to 85% relative humidity (non-condensing)
Maximum parameter ID (PID) rate:	approx.10 OBD PIDs/second

Note
- The solution is not suitable for OBD connections of trucks or other heavy-duty vehicles.
- The max. distance from the OBD port to the test bench computer is 15 m (other length upon request, max. 60 m).
- Prerequisites Automation system AVL PUMA 2 R5.2 or higher

2.1.4 IGEM 2 REGUL. & TC PACK BRAZIL PROCONVE

2.1.4.1 IGEM 2 BRAZIL PROCONVE NBR6601_2021 NL

No further technical information

2.1.4.2 IGEM 2 US 1066 NL

No further technical information

2.1.4.3 IGEM 2 BRAZIL PROCONVE FTP75

No further technical information

2.1.4.4 IGEM 2 BRAZIL PROCONVE HWFET

No further technical information

2.1.4.5 IGEM 2 EPA US NYCC

No further technical information

2.1.4.6 IGEM 2 US EVAPORATE PREPARATION CYCLES

No further technical information

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2.1.5 AVL iGEM 2 PROJECT SERVICES

2.1.5.1 AVL PROJECT MANAGEMENT - CUSTOMER PROJECT

AVL Project Management (Customer Project) includes the following tasks:

- Project support from kick-off to final acceptance of the system.
- The project manager is responsible for project management, scheduling, and resource planning in the project.
- Coordination of the services included in the scope of supply.
- Provide rapid support on all technical and procedural issues.
- Clarification of required responsibilities.
- Professional selection and management of external suppliers and subcontractors.
- The project manager attends project meetings via teleconferencing (usually) and on-site and prepare required reports and reviews.

Unusual issues are proactively addressed by the Project Manager and turned into efficient solutions.

Note

- If necessary, interpreters (except for German and English) must be provided by the customer.
- Travel and accommodation expenses for the AVL Project Manager, if necessary, will be charged separately.
- Costs are calculated for expected effort. Unexpected expenses that are not the responsibility of AVL may be charged separately.

2.1.5.2 iGEM 2 PROJECT MANAGEMENT

The Specialized Project Manager (PjM-s) for iGEM 2™ is responsible for the following tasks:

- Point of contact for the PjM for all project content, from signing the project to acceptance.
- Supporting the PjM in all technical or procedural matters.
- Participating in relevant project meetings via teleconferencing and preparing of reports and reviews (if required).
- Internal project schedule, and resource planning
- Project tracking and coordination and development of flowcharts, concepts, and proposed solutions for project execution.
- Provide goal-oriented leadership to project staff.
- Resolve unusual problems in the project and coordinate the problem-solving process when variances occur.

Notes

- Interpreters (except for German and English), must be provided by the customer, if necessary.
- Costs are calculated for expected effort. Unexpected effort which are not under responsibility of AVL can be charged separately.
- Possible travel and accommodation expenses are not included and will be listed in a separate article or charged separately if necessary.

2.1.5.3 iGEM 2 PROJECT ENGINEERING

Scope of the Project Engineering

- Setup of a simulation of the customer's environment.
- Configuration of the ordered standard AVL iGEM 2™ software modules to fit to the customer's environment.
- Test the scope of supply in AVL's simulation environment.
- Creation of an installable package for the commissioning.
- Support of the Project Leader and the onsite activities of the commissioning engineer.

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2.1.5.4 iGEM 2 INSTALLATION & COMMISSIONING

Tasks of the iGEM 2™ Commissioning Engineer:
- Installation of the software package prepared by the iGEM 2™ Project Engineer.
- Installation of necessary and supplied hardware.
- Commissioning and checking of the contractually agreed functionalities of AVL iGEM 2™ Online and Data Processing.
- Status reporting to the iGEM 2™ Project Leader.

Pre-requisites
- Test cell utilities are available and functional without interruptions during commissioning.
- Emission measurement devices are fully commissioned and functional.
- Required operation and calibration gases are available in sufficient quantities.
- Measurement equipment is operational and fully functional.
- A suitable unit under test (UUT) is and remains available until acceptance and is ready for operation.
- UUT and measurement equipment is conditioned and calibrated.
- The test system is available without interruption during the duration of commissioning.
- AVL iGEM 2™ relevant components installed by the customer or its sub-contractor are functional.
- The sites are secured sufficiently so that unauthorized persons do not have access.
- To demonstrate data transfers, if necessary, the appropriate computer system and network is available and operational (e.g. host systems)

Notes
- Travel and accommodation expenses for the iGEM 2™ Commissioning Engineer are listed in separate article.
- Interpreters (except for German and English), if necessary, must be provided by the customer.
- Additional time spent due missing pre-requisites mentioned above or subsequent request from customer will be invoiced at cost.

2.1.5.5 iGEM 2 ACCEPTANCE

The acceptance test results are documented in the Final Acceptance Protocol. This protocol will be reviewed with the customer together with the iGEM 2™ Commissioning Engineer and the Project Leader. After successful completion of the acceptance test and review of the protocol, the documents are to be signed by both parties. With the signature of the acceptance protocol AVL iGEM 2™ emission automation is handed over to the customer for productive use and the warranty period starts.
Open issues that do not prevent the customer from productive use of the emission test automation will be documented in an open issue list (OIL) that becomes part of the Final Acceptance Protocol.

Important Notes
The **AVL standard acceptance procedure** is solely intended for functional verification of an emission test cycle. The AVL standard acceptance procedure does not include any of the following:
- Creation of a compliance certificate
- Demonstration or validation of regulation compliance
- Correlation testing or validation of test results
- Qualitative assessment of test results

In case a customer specific acceptance procedure is requested, a written acceptance procedure specification is required. If the requested acceptance procedure goes beyond the standard acceptance procedure, the additional effort will be invoiced at cost.

The acceptance criteria of a customer specific acceptance procedure must be mutually agreed between the AVL Project Leader and customer prior to the beginning of the project, latest at the project kick-off meeting.

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Pre-requisite
- A customer representative is present during the entire Final Acceptance

Content
- Functional demonstration of one (1) Emission Test Cycle execution and related Data Processing
- Limit definition with one (1) unit under test and one (1) measurement device configuration
- Recording of successful test execution in acceptance protocol
- Review of the completeness of the scope of supply
- Review of the user documentation
- Final Acceptance Protocol (with or without Open Issue List)

2.1.5.6 TRAVEL EXPENSES INST. & COMM.

For the technical details please refer to pos 1.6.2.3

2.1.6 TRAINING FOR TESTBED AUTOMATION

2.1.6.1 TRAINING IGEM 2 VEHICLE

The training includes:
- 5 days instructor led training with hands-on practical exercises (9 am – 4 pm, breaks included)
- Training Material
- AVL Certificate for participants
- Drinks and lunch (if AVL is the venue for training)

Content:
- Introduction to AVL iGEM 2 VEHICLE software structure
- Overview Light Duty emission legislation and calculation
- Basic Parametrization and settings of measurement devices
- Emission Cycle Definition, Emission Limit Definition, Signal Mapping (ECD, ELD blocks, EMA Library)
- TST structure overview (BSQ, SSQ, DSQ)
- Communication with IDA Integrated Driver's Aid and chassis dyno
- Joint execution of (two standard) AVL iGEM 2 VEHICLE test runs (e.g. FTP75 and WLTP)
- Manual Data Entry window (Pre-Test Dialog)
- Report generation and contents explanation
- Result evaluation and analysis (e.g. with CONCERTO 5 – MS Excel)

Notes:
- Training class is conducted either in English or German (based upon customer request)
- Max. participants: 6 persons
- Venue at AVL, Graz (Austria) or optional at customer site
- Travel time and expenses for the trainer must be ordered additionally for trainings at customer site.

Prerequisites:
- Experience in the topics of exhaust emission and related legislation
- Experience in operation and parameterization of the PUMA 2 system
- If the training class is conducted at customer site, training equipment and safety gear for hands-on exercises must be provided by the customer.

Cancellation and Rescheduling:
Cancellation or rescheduling of confirmed training dates are subject to the following cancellation policy and fees:
- >14 calendar days prior to training start: 50% of the training fee
- 14 calendar days or less prior to training start: 100% of the training fee

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2.1.6.2 TRAVEL EXPENSES TRAINING iGEM 2 ON-SITE

For the technical details please refer to pos 1.6.2.3

2.2.1 BATTERY DEPLETING MEASUREMENT (TEST CELL)

2.2.1.1 X-METER

The AVL X-meter™ consists of universal front-end voltage inputs that can measure high voltage and current signals via probes and active current clamps that can be directly connected to the inputs. The voltage probes and current clamps receive their power supply directly from the inputs with simplifies the cabling considerably but still keeping the advantage the sensors (e.g. an HV Probe) can be mounted close to the signal source avoiding e.g. high voltage cables to travel around a vehicle. Each of the 8 front inputs fully supports the TEDS standard which allows to identify the connected sensors and read the scaling factors etc. This means that sensors can be exchanged without any necessity to change software settings.

- The X-meter™ is a compact and flexible 10 channel system to acquire data from various sources.
- 8 LEMO input-channels on the front record at 16bit, 2 additional 12bit input-channels are available on the back panel.
- Sampling rate 50 kS/s resulting in a signal bandwidth of 23kHz (CH1-8)
- The universal front-end voltage inputs can supply the AVL HV-Probes and active current clamps with operating power and TEDS communication.
- CAN-signal integration for e.g. battery voltage
- The rear-panel offers versatile connections to e.g. Ethernet and CAN-Bus
- A Single-Cable concept drastically simplifies installation efforts when switching charging locations and between different vehicle – reducing setup times, setup errors and safety risks.
- Comfortable and safe Single-Cable connection to optional CHARGER- and VEHICLE BOX
- Optional CHARGER-BOX allows quick, simple, and error-proof connection to charging stations.
- Optional VEHICLE-BOX for fast, safe, and simple switch between many different vehicles
- Comes along with AVL IndiCom Time™ software for flexible setup and powerful recording possibilities.
- Easy integration to automation systems like AVL Puma™, iGEM, Charge Monitor, vehicle systems like AVL M.O.V.E. or application systems like INCA™, CANape and others without separate PC

Primary Purpose of Device	DAQ system to record and process time-based signals
Analog Input channels	10 channels, voltage inputs
Sampling Rate per Channel (#1-8)	50 kS/s per channel
Analog Filter	#1-8: 23 kHz #9: 13 kHz #10: 230 Hz
Channel #	#1-8 #9 #10
ADC Resolution	16 bit 12 bit 12 bit
Input Voltage Range	+/-10 V +12 V + 48 V
Measurement Uncertainty at 23 °C	#1-8: 0.01 % reading + 0.015 % range #9-10: 0.5 % reading + 0.2 % range
Analog Input Signal	#1-8: 7p LEMO #9&10: Banana
CAN interface	CAN-Out or CAN-In (CAN-In in conjunction with IndiCom)
Interface	GigaBit Ethernet with 100 Mbit/s
Measurement mode	Time based data acquisition
Real Time Processing	Calculation of moving averages (from DC voltages and currents), RMS values (from AC voltages and currents), Charge, Power, Energy
Real Time Processing Update Rate	20 Hz (10Hz in conjunction with M.O.V.E. and iGEM)

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SW Package	IndiCom Time™
Temperature Range	-40 °C…55 °C
Dimensions W x H x D / Weight	9.5” x 1HU x 270 mm / 3 kg 242 mm x 44.45 mm x 270 mm / 3 kg
Power Supply / Consumption excl. accessories and sensors	9 – 36 V / 25 W; internally stabilized

Product Safety
The X-meter™ is designed to ensure that users are protected from high voltage lines. The length of high-power lines can be minimized due to the AVL HV-Probe concept. The probe itself can be placed close to the desired measurement point and be placed where the test operators is protected from high voltages. The connection from the HV-Probe to the X-meter™ is done with a signal cable that carries only safe low power signals. Mandatory protective ground connections are clearly labeled and ensure safe and trouble-free operation.

Content:
- AVL X-meter™
- AVL X-meter Product Guide
- AVL IndiCom™ Time Software
- Power supply unit 24 V/3 A
- Country-specific power supply cable 10 A, 2.5 m
- Ethernet cable IP20, 3 m, CAT 6 A

2.2.1.2 X-METER VEHICLE-BOX

No further technical information

2.2.1.3 VEHICLE-BOX CABLE 16-PIN LEMO 8M

No further technical information

2.2.1.4 HV-PROBE

Max. DC voltage input	1200 V
Input/Output voltage ratio	120:1 and 60:1
Frequency bandwidth	DC to 4 MHz
Input impedance	4 MOhm, 7 pF
Measurement uncertainty	0.02%Reading + 0.03% Range
TEDS Auto Calibration	Built in processor for device auto recognition and read out of calibration values
Power Supply	± 15V DC
Power Consumption	6 VA
Ambient Temperature	-10 ... +50 °C
Relative Humidity	10 … 75 % (not condensing)
Dimensions (Width x Height x Depth)	70 mm x 40 mm x 150 mm (without cable connectors)
Input sockets	2 touch proof HV 4mm sockets
Output sockets	7 pin LEMO socket
Ground connection	M6 threaded screw
Complying with Legal Regulations	CE

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Notes
- HV cables for the Input must be fused and fitted with touch proof 4mm plugs.
- The housing of the High Voltage Probe must be connected to protection earth before starting operation.

2.2.1.5 SENSOR CABLE LEMO 7P-7P 6M

No further technical information

2.2.1.6 CURRENT CLAMP HIOKI CT6841 20A

The current transducer HIOKI CT6841A features:
- Precision flux compensated current clamp.
- Overall accuracy up to 10 Hz: 2100,0 ppm
- Primary current range: AC 0 to 20 Arms, DC ± 20 A
- Secondary current range: ± 2,0 V
- Secondary ratio: 100,0 mV/A
- Aperture diameter for the primary conductor 20,0 mm

Power Supply current transducer	from AVL CTS-Box / AVL CSS-Box / X-ion PA / X-meter
Power Consumption	max. 5,0 VA
Operating / Storage Temperature	-40 °C … +85 °C / -40 °C … 85 °C
Relative Humidity	20 % ... 80 % (non-condensing)
Bandwidth @ -3 dB	2 MHz
Sensor Interface	ME15W
Isolation class (if applicable)	-
Dimensions (W x H x D)	153,0 x 67,0 x 25,0 mm
Weight	370,0 g
Design, mounting	Current Clamp Handheld Device
Complying with Legal Regulations	CE, EN 61010-1

Delivery details:
- Power supply resp. DAQ connection: Current clamp is equipped with a 3 m cable (ME15W interface)
- Power supply and signal cables are shielded.
- No calibration certificate is included.

Note:
- The supply unit AVL CTS-Box / AVL CSS-Box / X-ion PA / X-meter is not part of this article.

2.2.1.7 ADAPTERCABLE TEDS HIOKI CT - X-METER

The cable is including a TEDS chip (with information on identification sensor type, serial number, offset, range, transfer factor) which can be read out by X-meter.



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TEDS Adapter cable – for illustration purposes only

Cable length	0.2 m
Connector	LEM 7 pol (to X-meter)

2.2.2 IGEM 2 REGUL. & TC PACK BRAZIL PROCONVE HYBRID & BEV

2.2.2.1 IGEM 2 BRAZIL PROCONVE NBR16567_2016 NL

No further technical information

2.2.2.2 IGEM 2 BRAZIL PROCONVE NBR17142

No further technical information

2.2.2.3 IGEM 2 BRAZIL PROCONVE HYBRID HWFET

No further technical information

2.2.2.4 IGEM 2 BRAZIL PROCONVE HYBRID UDDS

No further technical information

2.2.2.5 ADD. iGEM 2 PROJECT ENGINEERING

No further technical information

2.2.2.6 ADD. iGEM 2 INSTALLATION & COMMISSIONING

Notes
- Additional travel and accommodation expenses for the iGEM 2™ Commissioning Engineer are listed in separate article.
- Interpreters (except for German and English), if necessary, must be provided by the customer.
- Costs are calculated for expected effort. Unexpected expenses that are not the responsibility of AVL may be charged separately.

2.2.2.7 ADD. TRAVEL EXPENSES COMM. iGEM2 EXTENSION

Additional travel expenses content
- Add. Accommodation cost
- Add. Daily allowance
- Add. Daily Transportation (Hotel <-> Customer)

Note
- Item can only be used in conjunction with travel expenses for regular installation & commissioning.

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AVL SlimLine™ Dilution Systems

Fascination has a new dimension

THE CHALLENGE

Because of new powertrain technologies and emission regulation changes, additional testing load is reaching an unprecedented peak in the history of vehicle emission testing. These changes result in more and longer test cycles, e.g. the WLTC cycle is up to 50 % longer than the NEDC. In addition to this exorbitant testing effort, space is becoming a restraining factor. The new regulations demand more testing devices and complex aftertreatment systems require simultaneous measurements from more sample points. This leads to an increased number of required analysis systems. What's more, driven by RDE legislation, the trend is to pull road tests ahead in the development process (road to lab) or to reproduce RDE tests on testbeds to increase efficiency. This creates the need to carry out full-flow dilution emission tests on powertrain or engine testbeds, where space is very limited.

THE SOLUTION

In 2017, the groundbreaking AVL AMA SL™ for raw exhaust measurements was launched. We then continued this revolution with our next technical innovation. The AVL SlimLine™ redefines diluted emission testing in research and development as well as certification. It enables the certification of passenger cars and corresponding engines, supporting all fuel types. The SlimLine combines the AVL AMA SL™ for diluted exhaust gas measurements with the AVL CVS SL™ dilution system and the AVL PSS SL™ particulate sampler. Thanks to its sustainable concept, the SlimLine not only enables testbeds to meet the highest design requirements, but also offers increased test performance and efficiency.

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AVL SlimLine™ systems in a powertrain testbed



AVL CVS SL™ double bag cabinet for up to 12 bags



Exchanging a filter holder in the heated compartment of the AVL PSS SL™

AVL AMA SL™

- Measures THC, CH_4, NO, NO_x, CO_2, CO and N_2O
- TWIN analyzers for simultaneous measurements
- Low sample gas flow enables smaller bag volumes
- Dedicated super-low-emission measurement system with analyzers for ultra-low concentrations
- Bag analysis in parallel to modal measurements

AVL CVS SL™

- Extended CVS flow rates (up to 40 m³/min) for tests of heavier vehicles or high-performance engines
- Faster and parallel analysis cycles due to smaller bags
- Improved venturi switching time by fast acting pinch valves
- Flexible location of CVS in- and outlets
- Optionally with heat exchanger

AVL PSS SL™

- Avoidance of condensation by heating the particle filter holders
- Rotary valve for filter selection with integrated shut-off function
- Energy saving through recovery of waste heat from the vacuum pump
- Flexible position of the dilution tunnel thanks to alternative setup with separate heated filter box
- Proportional particulate sampling

Delivery time: 4 months

Ease of Serviceability

- Smart system design: e.g. front access, fold-out parts, removable covers
- Easy and fast connection of analyzers thanks to multi-gas quick-connect coupling plate
- Spring-loaded fitting for quick and safe access
- Extended software-based diagnosis tools

Unique Efficiency

- Parallel calibration of analyzer channels and faster bag purging
- Maintenance intervals extended to 18 months
- Higher blower efficiency due to reduced pressure losses
- Automated and parallel diagnostic functions
- Reduced training effort due to low-voltage operation

Compliance

- Supports R&D and emission certification testing acc. to EPA 40 CFR part 1065/1066, post EU 6 and China 6
- Calibration according to ISO 17025 and JQA approval
- Multi-legislation checks with reports

Maximum Flexibility

- Simple adaptation to engine, powertrain and chassis dynamometers in existing test facilities thanks to the flexibility of the cabinet arrangement or the smaller footprint
- Compatibility with all common country-specific voltages thanks to wide-range power supply
- Lower noise emission of the AMA for use in the control room

Green Innovation

- Reduced CO_2 and energy consumption thanks to innovative cabinet design and intelligent heat recovery of pumps in order to heat up the filter box of the PSS
- Fewer wear parts due to improved durability of materials
- Reduction of spare parts through elimination of maintenance-intensive components
- Lower gas consumption of TWIN FID analyzer due to switch-off capability for the CH_4 flame

FIND OUT MORE

AVL Emission Test Systems GmbH
Graf-Landsberg-Straße 1C, 41460 Neuss
Germany

Phone +49 2131 5124 -0
Fax +49 2131 5124 -111
E-mail sales.emission@avl.com

www.avl.com/slimline

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CETESB

COMPANHIA AMBIENTAL DO ESTADO DE SÃO PAULO

CONTRATO Nº 078838

ANEXO 2

TERMO DE REFERÊNCIA ETTL-004-2025

ITEM 01

AQUISIÇÃO DE SISTEMAS DE AMOSTRAGEM E ANALISADORES PARA ENSAIOS DE EMISSÃO VEICULAR
QUANTIDADE: 1 (UMA) UNIDADE

CONDIÇÕES DE ELEGIBILIDADE DE FORNECEDOR: São considerados elegíveis os fornecedores que apresentarem equipamentos novos e/ou usados em suas demonstrações (Showroom), desde que os equipamentos atendam aos padrões de qualidade exigidos. Os requisitos incluem a execução das manutenções preventivas e corretivas recomendadas pelo manual do fabricante, a substituição dos conjuntos de peças consumíveis conforme necessário, que estejam isentos de avarias, com garantia de perfeito funcionamento e desempenho, e de comunicação entre os sistemas. Adicionalmente, é imprescindível que os equipamentos possibilitem a realização integral de ensaios conforme as normas ABNT NBR 6601, 7024, 16567 e 17142, vigentes, incluindo o ciclo de condução *New York* descrito na ABNT NBR 16927. Os equipamentos, bem como seus hardwares e softwares, devem estar atualizados e em conformidade com as mais recentes tecnologias disponíveis no mercado, além de representarem a versão mais atual do portifólio do fabricante. A garantia e assistência técnica associadas aos equipamentos usados deverão ser idênticas aos de equipamentos novos. Para assegurar a qualidade dos produtos e serviços, o fornecedor deverá comprovar experiência na área de emissão veicular, apresentando ao menos uma referência de instalação no Brasil que possua similaridade de configuração, de modo a garantir que os produtos estejam em conformidades com as exigências e necessidades específicas do mercado nacional.

ENTREGA: Todos os produtos e serviços adquiridos devem ser entregues, instalados e implementados em até 396 dias (13 meses), contados a partir da data da assinatura do contrato pelo fornecedor.

LOCAL DE INSTALAÇÃO DOS EQUIPAMENTOS: CETESB – Companhia Ambiental do Estado de São Paulo - ETTL – Setor de Laboratório de Emissão Veicular OTTO, localizado a Avenida Professor Frederico Hermann Jr., 345, Alto de Pinheiros, São Paulo, SP – CEP 05459-900.

GARANTIA E ASSISTÊNCIA TÉCNICA: Todos os produtos e serviços adquiridos e instalados deverão estar cobertos por uma garantia mínima de 12 meses, contados a partir da data de aceite final da instalação e comissionamento no laboratório.
Os serviços relacionados à assistência técnica deverão ser realizados por técnicos do fornecedor preferencialmente no local (in loco). Excepcionalmente, em comum acordo entre as partes, o serviço poderá ser executado nas oficinas da assistência técnica do fornecedor, sendo a logística responsabilidade do fornecedor.

ACEITAÇÃO: Para aceitação dos sistemas e dos equipamentos, o fornecedor deverá realizar no laboratório da CETESB (local de instalação) uma série de no mínimo 2 ensaios completos para verificação de precisão e repetitividade na operação de um veículo em ensaio, em conformidade com as normas brasileiras ABNT NBR 6601, 7024, 16567 e 17142, vigentes, incluindo o ciclo de condução *New York* descrito na ABNT NBR 16927, apresentando resultados que sejam compatíveis com os dados históricos do veículo testado.

Minuta do Contrato previamente aprovada pelo Departamento Jurídico da CETESB, conforme pág. 292 do processo.

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CETESB

COMPANHIA AMBIENTAL DO ESTADO DE SÃO PAULO

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DOCUMENTAÇÃO E IDIOMA: Todos os equipamentos, sistemas e programas de computador deverão ser acompanhados por manuais de instalação e operação. Adicionalmente equipamentos, sistemas, programas de computador, manuais de instalação e operação, certificados de calibração e treinamentos deverão ser apresentados em português ou/e inglês. Todos os programas de computador e sistemas operacionais devem possuir licença de uso permanente e vitalícia.

CONDIÇÕES AMBIENTAIS DE TRABALHO DOS EQUIPAMENTOS:
Temperatura de 15 °C a 40 °C e pressão de 800 hPa e 1050 hPa.

RELAÇÃO DE EQUIPAMENTOS E DE SISTEMAS:

ITEM 01 - 01 ANALISADOR DE HIDROCARBONETOS TOTAIS (THC) POR IONIZAÇÃO DE CHAMA E AQUECIDO (HFID). DEVE POSSUIR INTERNAMENTE DETECTOR DE HIDROCARBONETOS, FILTRO AQUECIDO E VÁLVULAS CONTROLADORAS DE FLUXO; PARA MEDIÇÃO DE GASES DE ESCAPAMENTO DE VEÍCULOS AUTOMOTORES; COM COMUNICAÇÃO VIA PROTOCOLO DE COMPARTILHAMENTO DE DADOS COM O SISTEMA DE GESTÃO DA BANCADA; COMBUSTÍVEL PARA ACIONAMENTO E ALIMENTAÇÃO DA CHAMA MISTURA GASOSA HIDROGÊNIO EM NITROGÊNIO E AR SINTÉTICO, CALIBRAÇÃO COM PROPANO; DEVE OFERECER MÍNIMO DE 4 FAIXAS DE OPERAÇÃO ENTRE 0 A 3000 PARTES POR MILHÃO DE CARBONO (PPMC); VAZÃO DE AMOSTRAGEM ENTRE 0,3 A 2,5 L/MIN.

ITEM 02 - 01 ANALISADOR DE METANO (CH4) POR IONIZACAO DE CHAMA TIPO CUTTER OU CROMATÓGRAFO. DEVE POSSUIR INTERNAMENTE DETECTOR DE HIDROCARBONETOS, FILTRO AQUECIDO E VALVULAS CONTROLADORAS DE FLUXO; PARA MEDIÇÃO DE GASES DE ESCAPAMENTO DE VEÍCULOS AUTOMOTORES; COM COMUNICAÇÃO VIA PROTOCOLO DE COMPARTILHAMENTO DE DADOS COM O SISTEMA DE GESTÃO DA BANCADA; COMBUSTÍVEL PARA ACIONAMENTO E ALIMENTAÇÃO DA CHAMA MISTURA GASOSA HIDROGÊNIO EM NITROGÊNIO E AR SINTÉTICO, CALIBRAÇÃO COM METANO; PROCEDIMENTO DE VERIFICAÇÃO DE EFICIÊNCIA DO ANALISADOR DE METANO; DEVE OFERECER MÍNIMO DE 4 FAIXAS DE OPERAÇÃO ENTRE 0 E 3000 PARTES POR MILHÃO DE CARBONO (PPMC); VAZÃO DE AMOSTRAGEM ENTRE 0,3 E 2,5 L/MIN.

ITEM 03 - 01 ANALISADOR DE ÓXIDO NÍTRICO (NO) E ÓXIDOS DE NITROGÊNIO TOTAIS (NOX) POR QUIMIOLUMINESCÊNCIA (CLD). DEVE POSSUIR INTERNAMENTE DETECTOR DE ÓXIDO NÍTRICO E ÓXIDOS DE NITROGÊNIO TOTAIS POR QUIMIOLUMINESCÊNCIA E VÁLVULAS CONTROLADORAS DE FLUXO; PARA MEDIÇÃO DE GASES DE ESCAPAMENTO DE VEÍCULOS AUTOMOTORES; COM COMUNICAÇÃO VIA PROTOCOLO DE COMPARTILHAMENTO DE DADOS COM O SISTEMA DE GESTÃO DA BANCADA; CALIBRAÇÃO COM ÓXIDO NÍTRICO; DEVE OFERECER MÍNIMO DE 4 FAIXAS DE OPERAÇÃO ENTRE 0 E 10000 PARTES POR MILHÃO DE COMPOSTO (PPM); VAZÃO DE AMOSTRAGEM ENTRE 0,2 E 2,5 L/MIN.

ITEM 04 - 01 ANALISADOR DE MONÓXIDO DE CARBONO (CO) POR ESPECTROSCOPIA DE INFRAVERMELHO NÃO DISPERSIVO (NDIR). DEVE POSSUIR INTERNAMENTE DETECTOR DE MONÓXIDO DE CARBONO E VÁLVULAS CONTROLADORAS DE FLUXO; PARA MEDIÇAO DE GASES DE ESCAPAMENTO DE VEÍCULOS AUTOMOTORES; COM COMUNICAÇÃO VIA PROTOCOLO DE COMPARTILHAMENTO DE DADOS COM O SISTEMA DE GESTÃO DA BANCADA; CALIBRAÇÃO COM MONÓXIDO DE CARBONO; PROCEDIMENTO DE VERIFICAÇÃO

Minuta do Contrato previamente aprovada pelo Departamento Jurídico da CETESB, conforme pág. 292 do processo.

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DE INTERFERÊNCIA DE CO2 E VAPOR D'ÁGUA DO ANALISADOR DE MONÓXIDO DE CARBONO; DEVE OFERECER, NO MÍNIMO 4 FAIXAS DE OPERAÇÃO, ENTRE 0 E 5000 PARTES POR MILHÃO DE COMPOSTO (PPM); VAZÃO DE AMOSTRAGEM ENTRE 0,5 E 3 L/MIN.

ITEM 05 - 01 ANALISADOR DE DIÓXIDO DE CARBONO (CO2) POR ESPECTROSCOPIA DE INFRAVERMELHO NÃO DISPERSIVO (NDIR). DEVE POSSUIR INTERNAMENTE DETECTOR DE DIÓXIDO DE CARBONO E VÁLVULAS CONTROLADORAS DE FLUXO; PARA MEDIÇÃO DE GASES DE ESCAPAMENTO DE VEÍCULOS AUTOMOTORES; COM COMUNICAÇÃO VIA PROTOCOLO DE COMPARTILHAMENTO DE DADOS COM O SISTEMA DE GESTÃO DA BANCADA; CALIBRAÇÃO POR DIÓXIDO DE CARBONO; DEVE OFERECER MÍNIMO DE 4 FAIXAS DE OPERAÇÃO ENTRE 0 E 6 % DE COMPOSTO; VAZÃO DE AMOSTRAGEM ENTRE 0,5 E 2,5 L/MIN.

ITEM 06 - DIVISORA E PROPORCIONADORA DE GASES. DEVE DILUIR A MISTURA PADRÃO DE GÁS EM NO MÍNIMO 11 PONTOS VIA MÉTODO DE MISTURA PROPORCIONAL DE GASES POR UM CONTROLADOR DE FLUXO MÁSSICO DIGITAL; PROJETADA PARA OPERAÇÃO FORA DO SISTEMA DE EMISSÃO CONTENDO FONTE DE ENERGIA; COM COMUNICAÇÃO VIA PROTOCOLO DE COMPARTILHAMENTO DE DADOS COM O SISTEMA DE GESTÃO DA BANCADA; DEVE OFERECER VAZÃO TOTAL DE 3,0 L/MIN A 4,5 L/MIN, PRESSÃO DE SAÍDA DE 0 KPA A 150 KPA, PRESSÃO MÁXIMA DE ENTRADA DE 90 KPA A 380 KPA.

ITEM 07 - CONVERSOR DE EFICIÊNCIA DE NOX. DEVE OFERECER FAIXA DE OPERAÇÃO ENTRE 0 E 1000 PARTES POR MILHÃO DE NO2 CONVERTIDO (PPM), VAZÃO TOTAL DE 1,8 L/MIN A 4,0 L/MIN, PRESSÃO DE SAÍDA DE 0 KPA A 150 KPA; PRESSÃO MÁXIMA DE ENTRADA DE 90 KPA A 380 KPA. PODE ESTAR INTEGRADO EM UM ÚNICO MÓDULO COM A DIVISORA DE GASES.

ITEM 08 - 01 RACK PADRÃO COMPATÍVEL COM OS ANALISADORES DE GASES DESCRITOS ACIMA PARA EMISSÕES DILUÍDAS, A SER CONECTADO EM AMOSTRADOR DE VOLUME CONSTANTE. COM COMPUTADOR E MONITOR DE TELA SENSÍVEL AO TOQUE PARA AUTOMAÇÃO DA BANCADA; COM SISTEMA DE BOMBAS E FILTROS PARA OS GASES DE AMOSTRA, VÁLVULAS PARA CONTROLE DOS GASES DE SERVIÇO E CALIBRAÇÃO, FONTE DE ENERGIA; NOBREAK PREPARADO PARA FECHAR OS PROGRAMAS E DESLIGAR O COMPUTADOR DE FORMA SEGURA EM SITUAÇÃO DE FALTA DE ENERGIA; TENSÃO DE TRABALHO 110V A 220V BIFÁSICO; FREQUÊNCIA 60HZ.

ITEM 09 - 01 SOFTWARE DE GESTÃO DA BANCADA INSTALADO NO COMPUTADOR INTEGRADO. DEVE PERMITIR O ACESSO DO OPERADOR AOS ANALISADORES E DEMAIS DISPOSITIVOS, PARA INDICAR OS VALORES MEDIDOS, OS DIAGRAMAS E FLUXO DE GASES, AUTOMAÇÃO DAS CALIBRAÇÕES, RELATÓRIOS E HISTÓRICO DAS CALIBRAÇÕES/VERIFICAÇÕES E LINEARIZAÇÃO; COM PROTEÇÃO DE ACESSO.

ITEM 10 – SISTEMA DE ASPIRAÇÃO FORÇADA. DEVE POSSUIR VAZÃO MÁXIMA DE 30M³/MIN, PROTEÇÃO ACÚSTICA E SILENCIADOR. PROTOCOLO DE COMUNICAÇÃO COMPATÍVEL COM O AMOSTRADOR DE VOLUME CONSTANTE. TENSÃO DE TRABALHO: 380V A 400V, FREQUÊNCIA: 60HZ.

ITEM 11 – SISTEMA DE TRATAMENTO DO AR DE DILUIÇÃO. DEVE CONTER PELO MENOS OS SEGUINTES COMPONENTES: FILTROS DE 2 ESTÁGIOS PARA PARTÍCULAS MAIORES E MENORES (CLASSE HEPA H14), FILTRO DE CARVÃO

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ATIVADO, SENSORES DE PRESSÃO E TEMPERATURA, AQUECIMENTO, COMPENSADOR DE PRESSÃO DO AR DE DILUIÇÃO E TUBULAÇÃO DE TRANSFERÊNCIA ISOLADA TERMICAMENTE. PROTOCOLO DE COMUNICAÇÃO COMPATÍVEL COM O AMOSTRADOR DE VOLUME CONSTANTE. TENSÃO DE TRABALHO: 380V A 400V, FREQUÊNCIA: 60HZ.

ITEM 12 – SISTEMA DE COLETA E DILUIÇÃO DOS GASES DE ESCAPAMENTO. DEVE COLETAR OS GASES DE ESCAPAMENTO EMPREGANDO UM CONECTOR AQUECIDO VIA ASPIRAÇÃO FORÇADA EM UM PONTO DE MISTURA AQUECIDO E REALIZAR A DILUIÇÃO VIA TÚNEL DE DILUIÇÃO TAMBÉM AQUECIDO, MONITORAR A TEMPERATURA, PRESSÃO E VAZÃO INTERNA DO SISTEMA E UMIDADE DO AR AMBIENTE. PROTOCOLO DE COMUNICAÇÃO COMPATÍVEL COM O AMOSTRADOR DE VOLUME CONSTANTE.

ITEM 13 – AMOSTRADOR DE VOLUME CONSTANTE. EQUIPAMENTO PARA COLETA DA DILUIÇÃO E DISTRIBUIÇÃO DOS GASES DE ESCAPAMENTO DILUÍDOS DE FORMA AQUECIDA PARA OS SACOS DE AMOSTRAGEM CONTENDO PELO MENOS 4 VENTURIS, UNIDADE DE CONTROLE DE TEMPERATURA; COMUTAÇÃO ELETRÔNICA DE VENTURIS VIA SOFTWARE DE GERENCIAMENTO, 2 SONDAS DE AMOSTRAGEM, VÁLVULAS PILOTADAS ELETRONICAMENTE PELA PROGRAMAÇÃO DO SOFTWARE DE GERENCIAMENTO, MONITORAMENTO DA TEMPERATURA E PRESSÃO INTERNA, MEDIDOR DE VAZÃO MÁSSICA, FILTROS E MONITORAMENTO DE FILTROS POR FOTOSENSORES. TENSÃO DE TRABALHO: 110V A 400V, FREQUÊNCIA: 60HZ, VAZÃO MÁXIMA DE 30M³/MIN. DEVE HAVER BOMBAS PNEUMÁTICAS PARA ENVIAR A AMOSTRA PARA OS ANALISADORES, CONTROLADO E MONITORADO POR SOFTWARE PRÓPRIO COMPATÍVEL COM A AUTOMAÇÃO DA OPERAÇÃO, PERMITINDO EXECUTAR TAREFAS PARALELAS DE ENCHIMENTO, ANÁLISE, EVACUAÇÃO E PURGA EM DIFERENTES PARES DE SACOS DE AMOSTRAGEM.

ITEM 14 – SISTEMA DE CONTROLE DE PRESSÃO DE ESCAPAMENTO QUANDO O MOTOR À COMBUSTÃO É DESLIGADO AO LONGO DO ENSAIO EM VEÍCULOS HÍDRIDOS E START-STOP. DEVE IMPEDIR A QUEDA DE TEMPERATURA E ABSORÇÃO DE OXIGÊNIO DO CATALISADOR, NÃO IMPACTAR O CONTROLE DA VÁLVULA EGR, NÃO PERMITIR A PERDA DE MATERIAL PARTICULADO. PROTOCOLO DE COMUNICAÇÃO COMPATÍVEL COM O AMOSTRADOR DE VOLUME CONSTANTE.

ITEM 15 - MATERIAIS CONTEMPLADOS NO SISTEMA DE COLETA E DILUIÇÃO DOS GASES DE ESCAPAMENTO E AMOSTRADOR DE VOLUME CONSTANTE. DEVE CONTEMPLAR PELO MENOS OS SEGUINTES MATERIAIS: PONTEIRAS COM DIVERSOS DIÂMETROS, MANGUEIRAS ISOLADAS E AQUECIDAS PARA A AMOSTRAGEM DOS GASES DE ESCAPAMENTO, SUPORTE MÓVEL PARA ADAPTAÇÃO DAS MANGUEIRAS ISOLADAS E AQUECIDAS, CABOS DE ALIMENTAÇÃO, CABOS DE SINAL E TUBULAÇÃO DE AÇO INOXIDÁVEL PARA INTERCONEXÃO ENTRE OS EQUIPAMENTOS.

ITEM 16 – GABINETE DE ARMAZENAMENTO E CONTROLE DE SACOS DE AMOSTRAGEM. DEVE POSSUIR NO MÍNIMO 4 SACOS DE AMOSTRAGEM PARA O AR DE DILUIÇÃO E 4 SACOS DE AMOSTRAGEM PARA OS GASES DE ESCAPAMENTO DILUÍDOS, ARMAZENADOS EM AMBIENTE CONTROLADO E AQUECIDO, COM MONITORAMENTO DE TEMPERATURA, BOMBAS PNEUMÁTICAS ADEQUADAS PARA A OPERAÇÃO DE ARMAZENAMENTO DE GASES NOS SACOS, CONTROLADO POR SOFTWARE PRÓPRIO COMPATÍVEL COM A AUTOMAÇÃO DA OPERAÇÃO.

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ITEM 17 – ORIFÍCIO DE FLUXO CRÍTICO. EQUIPAMENTO DE INJEÇÃO DE PROPANO QUANTIFICADO PARA VERIFICAÇÃO DE ESTANQUEIDADE DA LINHA DE COLETA E ARMAZENAMENTO DE AMOSTRAGEM DE GASES COM COMUNICAÇÃO VIA SOFTWARE PRÓPRIO COMPATÍVEL COM A AUTOMAÇÃO DOS ANALIZADORES. VAZÃO DE 50 A 430ML/MIN, GÁS DE UTILIZAÇÃO: PROPANO QUIMICAMENTE PURO, PRESSÃO MÁXIMA: ATÉ 10BAR, TEMPO DE ESTABILIZAÇÃO DE ATÉ 50S, PRECISÃO DE ATÉ 0,4% DA VAZÃO, CONTENDO TUBOS DE TEFLON, CONECTORES DE ENGATE RÁPIDO, SONDA DE INJEÇÃO, CONEXÃO DE TUBO 6MM, MONITORAMENTO DE TEMPERATURA POR SENSOR PT100 COM PRECISÃO DE ATÉ 0,2°C.

ITEM 18 – ELEMENTO DE FLUXO LAMINAR (LFE). EQUIPAMENTO PARA VERIFICAÇÃO DA VAZÃO DOS VENTURIS, COM MONITORAMENTO DE TEMPERATURA, UMIDADE E PRESSÃO COM UMA INTERFACE SEMI-AUTOMÁTICA DE USUÁRIO PARA UTILIZAÇÃO VIA SOFTWARE. DEVE ARMAZENAR NO MÍNIMO 4 CURVAS DE CALIBRAÇÃO.

ITEM 19 – AUXILIAR DE CONDUTOR. DEVE TER UMA TELA DE EXIBIÇÃO DE GRÁFICO COMPATÍVEL COM O ENSAIO, COMUNICAÇÃO COM O PROGRAMA DE GESTÃO DOS ANALISADORES COM E SEM FIO DE MODO A PERMITIR A SELEÇÃO/NAVEGAÇÃO REMOTA DE CICLOS DE CONDUÇÃO, MOSTRAR OS TEMPO (S), VELOCIDADE (KM/H) E DISTÂNCIA (KM) PERCORRIDA NO DINAMÔMETRO, COMANDO POR CONTROLE REMOTO DE INÍCIO, PAUSA, FINALIZAÇÃO E ACIONAMENTO DE PAUSA EMERGENCIAL DO ENSAIO.

ITEM 20 – 02 ESTAÇÕES METEOROLÓGICAS PARA MEDIÇÃO E AQUISIÇÃO DE DADOS DE PRESSÃO BAROMÉTRICA, TEMPERATURA E UMIDADE AMBIENTE. CONTENDO SENSOR DE PRESSÃO BAROMÉTRICA E SONDAS DE TEMPERATURA E UMIDADE PARA MEDIÇÃO DE CONDIÇÕES AMBIENTES, DISPLAY QUE PERMITA EXIBIÇÃO/NAVEGAÇÃO DE TODOS OS DADOS MEDIDOS E GRAVADOS, ALÉM DE PROTOCOLO DE COMUNICAÇÃO COMPATÍVEL COM A PLATAFORMA DE SOFTWARES DE GESTÃO DE AUTOMAÇÃO.

ITEM 21 – EQUIPAMENTO DE VARREDURA DE DADOS VEICULARES. DEVE TER OS COMPONENTES NECESSÁRIOS PARA A CONEXÃO ENTRE A PLATAFORMA DE SOFTWARES DE GESTÃO DE AUTOMAÇÃO E UMA PORTA OBD II DO VEÍCULO; SOFTWARE QUE CONTEMPLA VÁRIAS LISTAS DE VARREDURA OBD PID PERMITINDO RECUPERAR DADOS VEICULARES.

ITEM 22 – AMOSTRADOR DE MATERIAL PARTICULADO. EQUIPAMENTO PARA COLETA DE MATERIAL PARTICULADO, CONTENDO PELO MENOS: SONDA DE AMOSTRAGEM DE MATERIAL PARTICULADO DA LINHA DE DILUIÇÃO DOS GASES DE ESCAPAMENTO, 4 PORTAS FILTROS EM RACK AQUECIDO, CAIXA SUPORTE E TAMPAS PARA O TRANSPORTE DE ATÉ 4 PORTAS FILTROS, COMPONENTE PARA MEDIÇÃO DE FUNDO DE MATERIAL PARTICULADO; CONTROLADOR DE FLUXO DE MASSA, VÁLVULAS, BOMBA DE AMOSTRAGEM E SENSORES DE TEMPERATURA. TEMPERATURA INTERNA DO RACK DE 42° A 52°C. CONTROLADO E MONITORADO POR SOFTWARE PRÓPRIO COMPATÍVEL COM A AUTOMAÇÃO DA OPERAÇÃO.

ITEM 23 – ELEMENTO DE FLUXO LAMINAR (LFE) DO AMOSTRADOR DE MATERIAL PARTICULADO. EQUIPAMENTO PARA VERIFICAÇÃO DA VAZÃO DO AMOSTRADOR DE MATERIAL PARTICULADO, COM MONITORAMENTO DE TEMPERATURA, UMIDADE E PRESSÃO COM UMA INTERFACE DE USUÁRIO PARA UTILIZAÇÃO VIA SOFTWARE. DEVE ARMAZENAR NO MÍNIMO 4 CURVAS DE CALIBRAÇÃO.

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ITEM 24 – EXTENSÃO PARA VEÍCULOS ELÉTRICOS HÍBRIDOS E PURAMENTE ELÉTRICOS. DEVE CONTEMPLAR PELO MENOS EQUIPAMENTO AUTÔNOMO E COMPACTO PARA AQUISIÇÃO E PROCESSAMENTO DE DADOS, MEDIÇÃO DE CORRENTE ELÉTRICA CONTÍNUA E ALTERNADA E POTÊNCIA ELÉTRICA, DISTRIBUIÇÃO E BALANCEAMENTO DE ENERGIA, MONITORAMENTO DE CONSUMO DE BATERIA (CARGA/DESCARGA), PROVEDOR DE RESULTADOS DE CÁLCULOS E PERMITINDO ANÁLISE DE DADOS BRUTOS POR MEIO DE SOFTWARE PRÓPRIO OU EM CONJUNTO COM A PLATAFORMA DE SOFTWARES DE GESTÃO DE AUTOMAÇÃO; DISPOSITIVO PARA AUXILIAR A INSTRUMENTAÇÃO E CONFIGURAÇÃO DE VEÍCULOS ELÉTRICOS HÍBRIDOS PLUG-IN E PURAMENTE ELÉTRICO; SONDA PARA MEDIR ALTA TENSÃO EM CORRENTE CONTÍNUA EM VEÍCULOS ELÉTRICOS HÍDRIDOS E PURAMENTE ELÉTRICOS, CONVERTENDO ALTA TENSÃO DE CORRENTE CONTÍNUA EM BAIXA TENSÃO; ALICATE AMPERÍMETRO PARA MEDIÇÃO DE CORRENTE CONTÍNUA E ALTERNADA EM MOTORES ELÉTRICOS HÍDRIDOS E PURAMENTE ELÉTRICOS, CONVERTENDO ALTA CORRENTE PRIMÁRIA EM UMA RESPECTIVA TENSÃO SECUNDÁRIA ISOLADA GALVANICAMENTE; CABOS DE ALIMENTAÇÃO, CABOS DE SINAL, CONECTORES, PINÇAS, ADAPTADORES. SENSORES E DEMAIS COMPONENTES NECESSÁRIOS PARA A EXECUÇÃO DE ENSAIOS CONFORME NORMA ABNT NBR 16567 E 17142 VIGENTE, INCLUINDO CONDICIONAMENTOS.

ITEM 25 – HARDWARE CENTRAL E PLATAFORMA DE SOFTWARES DE GESTÃO DE AUTOMAÇÃO DE EQUIPAMENTOS INSTALADA EM COMPUTADOR INTEGRADO. DEVE PERMITIR A VIZUALIZAÇÃO E CONTROLE DO RACK DE ANALISADORES, AMOSTRADOR DE VOLUME CONSTANTE, AMOSTRADOR DE MATERIAL PARTICULADO, EQUIPAMENTOS DE VERIFICAÇÃO/CALIBRAÇÃO E DEMAIS EQUIPAMENTOS RELEVANTES, ALÉM DA EXECUÇÃO DE CICLOS DE CONDUÇÃO DE ENSAIOS DE EMISSÃO E CONSUMO CONFORME AS NORMAS ABNT NBR 6601, 7024, 16567 E 17142, INCLUINDO O CICLO DE CONDUÇÃO *NEW YORK* DESCRITO NA ABNT NBR 16927, VIGENTES, EM COMPUTADOR INTEGRADO; CONTER SOFTWARES DE DIAGNÓSTICO AUTOMATIZADO COM PROTEÇÃO DE ACESSO PARA MONITORAMENTO DE PARÂMETROS E VALORES, PROCESSAMENTO, VIZUALIZAÇÃO E ANÁLISE DE DADOS, MEDIDOS E SIMULADOS, EXECUÇÃO DE VERIFICAÇÕES/CALIBRAÇÕES INCLUINDO AS CONSTANTES NAS NORMAS ABNT NBR 6601, 7024, 16567 E 17142, INCLUINDO O CICLO DE CONDUÇÃO *NEW YORK* DESCRITO NA ABNT NBR 16927, VIGENTES, PROCESSAMENTO E VERIFICAÇÃO DE CÁLCULOS, HISTÓRICO DOS DADOS, EMISSÃO DE RELATÓRIOS DE VERIFICAÇÕES/CALIBRAÇÕES, EMISSÃO DE RELATÓRIOS DE ENSAIO CONFORME AS NORMAS ABNT NBR 6601, 7024, 16567, 17142, 12026, 15598, 10972 E 16927 VIGENTES, SELEÇÃO DE LIMITES LEGAIS E AVALIAÇÃO DE DADOS ESTATÍSTICOS; PERMITIR INCLUSÃO MANUAL DOS DADOS QUE NÃO POSSAM SER AUTOMATIZADOS NO MOMENTO DA INSTALAÇÃO POR NÃO HAVER COMUNICAÇÃO ADEQUADA DOS EQUIPAMENTOS ATUALMENTE INSTALADOS; TODOS OS DADOS GERADOS TAMBÉM DEVEM ESTAR DISPONÍVEIS EM AMBIENTE EDITÁVEL VIA EXPORTAÇÃO A PLANILHAS, PRESERVANDO OS DADOS ORIGINAIS.

ITEM 26 - GERENCIAMENTO LOCAL DO PROJETO E COMISSIONAMENTO – INSTALAÇÃO, COLOCAÇÃO EM SERVICO FUNCIONAL, VERIFICAÇÃO DOS EQUIPAMENTOS E TREINAMENTO DOS TÉCNICOS DA CETESB, INCLUINDO A DESEMBALAGEM DOS EQUIPAMENTOS, VERIFICAÇÃO QUANTO À INTEGRIDADE, MONTAGEM, ACOMPANHAMENTO DA INTEGRAÇÃO DO SISTEMA COM OS EQUIPAMENTOS ATUALMENTE INSTALADOS E EVOLUÇÃO DA IMPLANTAÇÃO DAS NECESSIDADES, CONEXÃO DE TODOS OS CABOS DE SINAL E ALIMENTAÇÃO DO SISTEMA, CONEXÃO DOS TUBOS DE GÁS, EXTRAÇÃO E DRENOS DO SISTEMA,

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CETESB

COMPANHIA AMBIENTAL DO ESTADO DE SÃO PAULO

CONTRATO Nº 078838

DENTRE OUTRAS LIGAÇÕES E CONEXÕES ELÉTRICO-ELETRÔNICAS/ELETRÔNICAS/MECÂNICAS DOS EQUIPAMENTOS, GERENCIAMENTO DO PROJETO PARA ASSEGURAR A CORRETA MONTAGEM DOS SISTEMAS, CALIBRAÇÃO/VERIFICAÇÃO E INICIALIZAÇÃO (STARTUP) DOS EQUIPAMENTOS/SENSORES, INSTALAÇÃO/PARAMETRIZAÇÃO BÁSICA DOS SOFTWARES, TREINAMENTO TEÓRICO E PRÁTICO EMPREGANDO MANUAIS E/OU APOSTILAS PARA CAPACITAÇÃO TÉCNICA DOS OPERADORES, INCLUINDO O ACOMPANHAMENTO NA ELABORAÇÃO DE DOIS ENSAIOS COMPLETOS DE CADA TIPO PELO CLIENTE PARA VERIFICAÇÃO DE PRECISÃO E REPETITIVIDADE E NOÇÕES BÁSICAS DE MANUTENÇÃO (TROUBLE-SHOOTING). OBS: ITEM DEVE INCLUIR CUSTOS DE MÃO DE OBRA, DESLOCAMENTO, MATERIAIS, IMPOSTOS NÃO ISENTOS, TRANSPORTE E ALIMENTAÇÃO.

ITEM 27 - MATERIAIS CONTEMPLADOS NO GERENCIAMENTO LOCAL DO PROJETO E COMISSIONAMENTO. DEVE CONTEMPLAR OS SEGUINTES MATERIAIS: CABOS DE ALIMENTAÇÃO, CABOS DE SINAL E TUBULAÇÃO DE AÇO INOXIDÁVEL PARA INTERCONEXÃO ENTRE OS EQUIPAMENTOS. TUBOS DE TEFLON PARA A INTERCONEXÃO DOS EQUIPAMENTOS AO PAINEL DE GASES, A EXCEÇÃO DAS LINHAS QUE FAZEM PARTE DA CENTRAL DO PAINEL DE GASES.

DEFINIÇÃO DE RESPONSABILIDADES:

Descrição	Cliente	Fornecedor
Retirada da embalagem e instalação dos equipamentos		X
Obras civis, fixação/chumbamento dos equipamentos e estruturas de sustentação (exceto fornecimento de estruturas de sustentação)	X	
Fornecimento e operação de ferramentas pesadas (empilhadeira, etc.)	X	
Disponibilidade e adequação de infraestrutura elétrica e eletrônica externa ao sistema, exaustão dos gases de escapamento e suprimento de ar comprimido, gases comuns e especiais	X	
Fornecimento e instalação de dutos, calhas e conduítes (separar cabos de potência e sinal)	X	
Fornecimento de filtros externos ao sistema	X	
Armazenamento dos equipamentos em local fechado, seco e arejado	X	
Disponibilidade de local para guarda das ferramentas do fornecedor e uniformes (com controle de acesso)	X	
Acabamento das salas	X	
Transporte interno dos equipamentos até o local de instalação	X	
Fornecimento de veículos em condições de uso para os testes dos equipamentos	X	
Fornecimento de Declaração referente ao atendimento médico de emergência, com informações sobre os procedimentos a serem adotados em casos de Acidente ou Mau Súbito com os profissionais, assim como meio de transporte a ser empregado, Serviço de Saúde (hospital, pronto socorro etc.) onde será(ão) levado(s) o(s) acidentado(s) ou doente(s) e designação da pessoa da contratada responsável por isso		X
Disponibilidade de linha de telefone com linha externa	X	
Acompanhamento integral por técnico da empresa	X	
Disponibilidade de sala adequada para o treinamento com recurso audiovisual	X	

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Observação: Todos os serviços que demandam contratação de mão de obra especializada para auxiliar o cumprimento do objeto da contratação, Tais como detalhamento da infraestrutura elétrica necessária, como tensão, quantidade/tipos de disjuntores, tomadas etc., próxima ao local de instalação dos equipamentos, devem ser comunicados em detalhes com em até 90 dias após a assinatura do contrato pelo fornecedor.

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